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Small Arms Training

Volume I, Pamphlet No. 13

Grenade

1937

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Stationery Office)

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OTTAWA
J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1940

8M-8-40 (6291)
H.Q. 70-44-61

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Sgt P. Munn
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By Command of the Army Council,

H. J. CREEDY

THE WAR OFFICE,

31st March, 1937.

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GENERAL

1. There are three types of grenades—high explosive (H.E.), smoke and signal.

The principles governing the use of H.E. and smoke grenades in battle are laid down in Infantry Training and Infantry Section Leading.

2. These principles are based on their characteristics, which are:—

- i. *Relatively short range.*—The H.E. grenade can be thrown by hand a distance of 25 to 35 yards. The H.E. and smoke grenade can be fired from a rifle by means of an attachment called the "discharger" and have an approximate maximum range of 200 yards and minimum of 80 yards.
- ii. *High trajectory and steep angle of descent.*—With the H.E. grenade this provides considerable searching power. An enemy behind bullet-proof cover can thus be driven into the open.
- iii. *Relatively heavy weight.*—The weight of the H.E. grenade is about $1\frac{1}{2}$ lb. and that of the smoke grenade $1\frac{1}{4}$ lb. and thus limits the number which can be carried by an individual or in regimental transport.
- iv. *Large danger area.*—The probable danger area of a H.E. grenade may be taken to be 20 yards in all directions from the point of burst. Large fragments may, however, have sufficient velocity to inflict wounds up to 100 yards or more, particularly if the burst is on stony ground.
- v. *Susceptibility to wind.*—The flight of grenades from the discharger is considerably affected by the strength and direction of the wind. Corrections to allow for deflection will frequently be required, and in some cases it may even be necessary to increase or decrease range adjustment. Only experience will enable rifle bombers to judge the necessary allowances for deflection or range adjustment.

3. Employment of grenades:—

- i. H.E. grenades should be burst on or close to the target.
- ii. Smoke grenades are of value for blinding small enemy posts for a short period. Since only a limited number can be carried, their use with reference to the wind and the proposed direction of the movement to be made under cover of the screen must be carefully worked out. They should seldom be thrown, and their use for overhead fire is inadvisable. Every man should understand how to build up a smoke screen.

4. Details of grenade firing and throwing areas are laid down in S.A.T., Vol. V, 1931, Chap. VII.

5. Instructors will impress on men the necessity for common sense, care and knowledge of the nature of grenades, but will not lay too much stress on the question of danger. To do so will cause lack of confidence and nervousness in handling.

6. The details of instruction with live material are set out on page 37 *et seq.*

7. When H.E. grenades are used, the instructor will always cause the first safety precautions to be carried out.

SECTION 1.—DESCRIPTION OF H.E. GRENADE AND DISCHARGER

(Lessons 1 to 3)

LESSON 1.—DESCRIPTION AND MECHANISM (H.E. GRENADE)

Instructor's Notes

Stores:—

*Cut grenade with dummy igniter set.
Dummy No. 36 for each man (with gas check).
Dummy igniter set for each man.
Base plug key.*

1. Introduction.

Explain briefly the characteristics and employment of grenades (see paras. 1 to 4, pages 4 and 5).

2. First safety precaution.

Explain and demonstrate:—

i. How to recognize the No. 36 grenade:—

The live No. 36 grenade is varnished on the outside as a protection against rust and is black in colour; a red band is painted round the top of the body and over the filling screw to denote that the grenade is filled.

The dummy No. 36 grenade is grey in colour, or it may be painted white; there is no coloured band.

ii. Demonstrate, with squad imitating, the first safety precaution, which is the removal of the base plug and making certain that the grenade is not primed.

3. Stripping.

- i. Explain that it is necessary to strip the grenade in order to examine it for any defects or faulty construction.
- ii. Demonstrate, with squad imitating, stripping of the grenade:—Close the points of the safety pin. Hold the grenade with the lever in the palm of the hand and remove the pin. Place the base of the grenade against the body or waistbelt, release the lever and allow the striker to fall. Remove striker and spring from grenade.

4. Description of H.E. Grenade.

Using a "cut" grenade, describe, naming each part (see Fig. 1).

i. The body:—

The outside is grooved to assist the breaking up of the grenade and also to give a grip to the hand when throwing.

The top is drilled for the passage of the striker and has two shoulders, in front of which is a screwed filling hole which is closed by the filling screw.

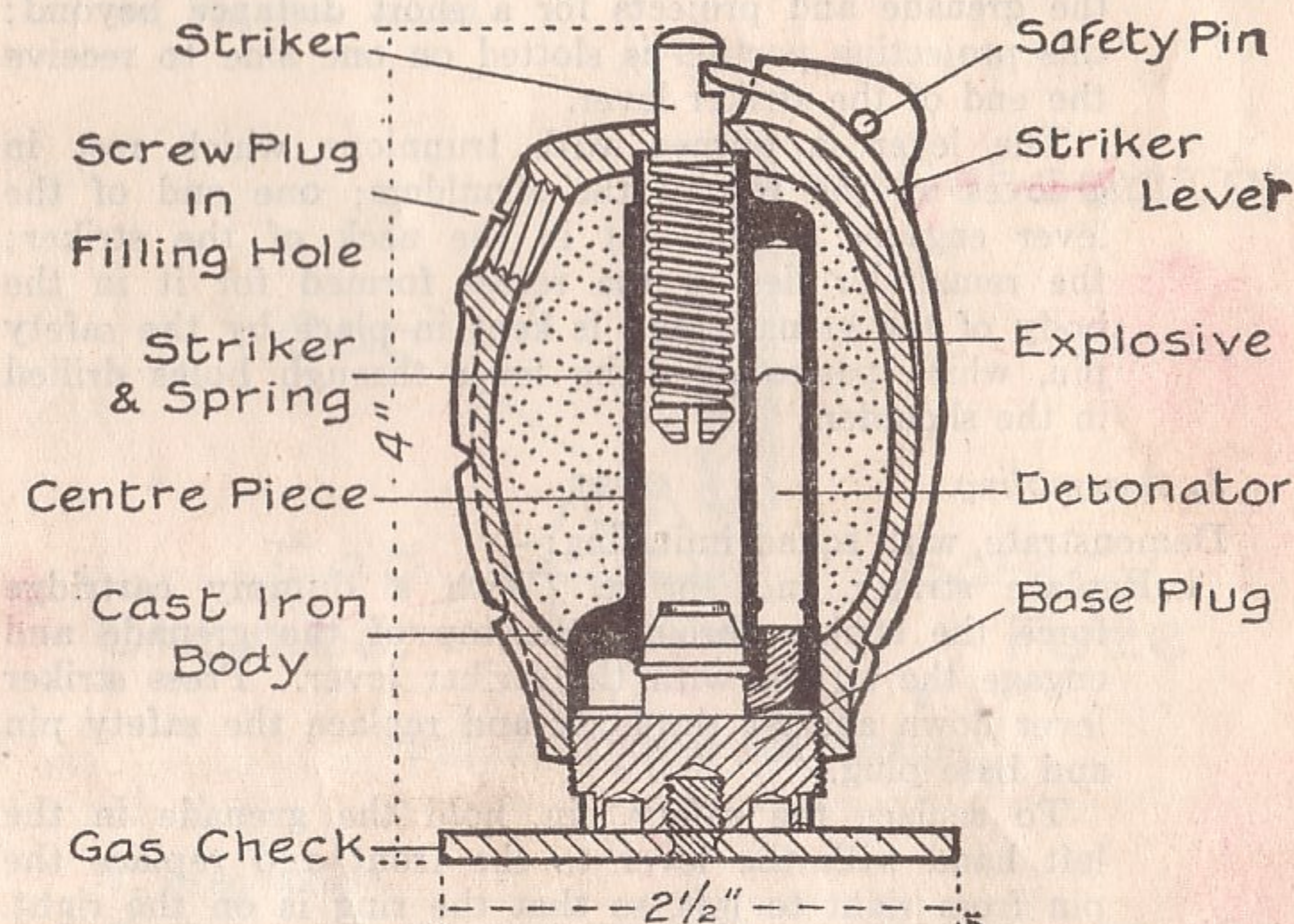


FIG. 1.—H.E. Grenade (with gas check fitted).

Behind the shoulders there is a recess running the length of the body in which the striker lever lies so that its surface is level with the surface of the grenade. This "flush" fitting of the lever prevents it catching in anything when being carried in or withdrawn from the haversack; it also facilitates safe loading into the discharger.

ii. The centre piece has two sleeves.

The striker sleeve contains the striker and striker spring.

The other sleeve, which is small and set alongside the striker sleeve, is for the detonator; it is closed at the inner end.

The centre piece is covered by the base plug.

- iii. The striker is formed with a head and neck. The head is slotted to form a gas escape and has two nipples. The striker spring surrounds the neck of the striker and bears against the head; the other end of the spring bears against the inside of the body of the grenade.

When the spring is compressed, the neck of the striker passes through the hole drilled in the end of the grenade and projects for a short distance beyond; this projecting portion is slotted on one side to receive the end of the striker lever.

The lever is formed with trunnions which rest in grooves on the top of the shoulders; one end of the lever engages in the slot in the neck of the striker; the remainder lies in the recess formed for it in the body of the grenade and is kept in place by the safety pin, which passes over the lever through holes drilled in the shoulders.

5. Assembling.

Demonstrate, with squad imitating:—

- i. Replace striker and spring. With a dummy cartridge force the striker through the top of the grenade and engage the striker with the striker lever. Press striker lever down against the body and replace the safety pin and base plug.

To replace the safety pin, hold the grenade in the left hand with the lever to the front and replace the pin from right to left, so that the ring is on the right. Open out the points to prevent the pin coming out.

- ii. The base plug has two recesses formed to receive a special tightening key called the base plug key. There is a screwed hole in the centre of the base plug for the attachment of the gas check when grenades are fired from the discharger.
- iii. Practise squad.

6. The igniter set.

- i. Explain that the igniter set is composed of a cap chamber in which is fitted a .22-rim fire cartridge case provided with a central gas escape in the base; the gas escape is covered with a disc of waterproof paper to exclude damp.

A seven-seconds length of buff safety fuze is fitted into the cap and the joint covered with varnish. The other end of the fuze is fitted into a detonator (see Fig. 2).

- ii. The set must be handled carefully and only held by the cap chamber and fuze.
- iii. Demonstrate, with squad imitating.

To prime the grenade, remove the base plug, hold the igniter set by the fuze and insert the detonator and cap chamber into their respective sleeves. Replace the base plug and tighten it with the key.

- iv. Practice squad.

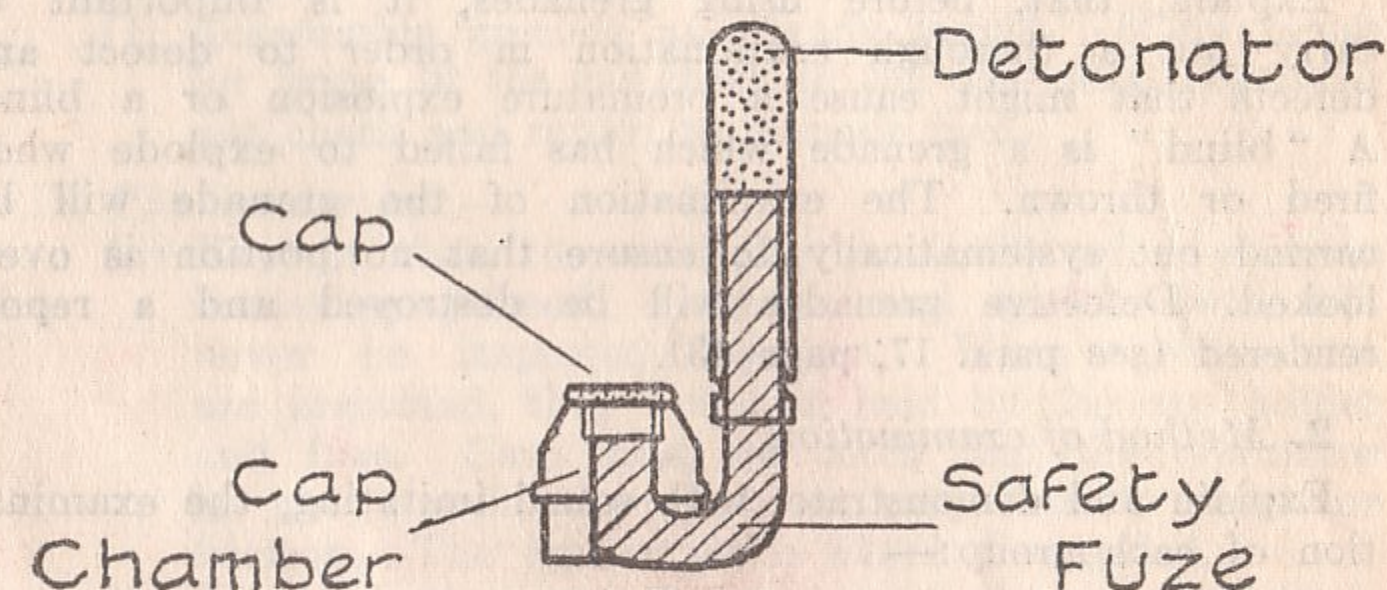


FIG. 2 —Igniter Set (section).

7. Mechanism.

Explain and demonstrate with cut grenade and dummy igniter set:—

- i. Hold the grenade firmly with the lever under the fingers; withdraw safety pin. So long as the lever is held, the grenade is safe.
- ii. When the grenade leaves the hand or discharger, the lever flies off, the striker is forced down on to the cap of the igniter set by the spring, and ignites the fuze which burns for 7 seconds, at the end of which time the grenade explodes.
- iii. While the fuze is burning, the gases escape through the escape hole in the cap, the gas slot in the striker and the striker sleeve to the outer air.

LESSON 2.—POINTS BEFORE FIRING OR THROWING (H.E. GRENADE)

Instructor's Notes

Stores:—

Dummy H.E. grenade and gas check for instructor and each man.

Dummy igniter set for instructor and each man.

Luting.

After examination of the grenades is finished, grenades will be placed away from the squad, before the examination of the igniter set begins.

1. Importance of examination.

Explain, that, before using grenades, it is important to carry out a thorough examination in order to detect any defects that might cause a premature explosion or a blind. A "blind" is a grenade which has failed to explode when fired or thrown. The examination of the grenade will be carried out systematically to ensure that no portion is overlooked. Defective grenades will be destroyed and a report rendered (*see para. 17, page 43*).

2. Method of examination.

Explain and demonstrate, with squad imitating, the examination of each group:—

i. The body:—

- (a) Carry out first safety precaution to ensure that the grenade is safe, *i.e.* not primed. Examine the outside for cracks through which damp might enter, causing a "blind."
- (b) Examine the filling screw to see that it is fully home and sealed to prevent damp entering the charge.
- (c) Examine the shoulders to see that they are unbroken so that there can be no premature release of the striker.

ii. The striker group:—

- (a) Examine the projecting portion of the striker to see that it is properly sealed with wax to prevent damp entering the centre piece, and that the lever is engaged.
- (b) Examine the safety pin to see that it is sound and the lever properly held in the shoulders and close to the grenade to prevent it catching in the ring of another grenade or on the edge of the discharger in loading.

- (c) Apply the striker test as follows:—Strip the grenade as already taught (*Lesson 1, 3*). Take the striker from its spring, remove any grease from the striker and replace striker and spring in the grenade: see that it works perfectly freely in the striker sleeve.

This test ensures that the whole of the striker mechanism is in working order; a jammed striker may cause a "blind." A grenade in which the spring appears weak or stiff should not be used.

- (d) Examine the centre piece.—Both sleeves should be clean and free from corrosion. Examine the wall between the sleeves for cracks, which would allow the flash from the cap to pass direct to the detonator, causing a premature.
- (e) Examine the striker face to see that it has two nipples and a gas slot.
- (f) Reassemble grenade as already taught. If preparing for firing, fit the gas check to the base plug. Remove gas check and return to grenade box.

iii. The igniter set:—

- (a) Explain that, to avoid the possibility of a grenade becoming primed, grenades and igniter sets will never be inspected together. When igniter sets are inspected, they must be held by the cap holder and fuze. Care must be taken that the detonator is not struck, damaged or subjected to heat or friction. The igniter set is never dismantled.
- (b) Examine the central gas escape to see that it is covered with waterproof paper to prevent damp, and is properly fitted to the chamber.
- (c) Examine the fuze for firm fixing and varnished joint.
- (d) Examine the detonator to see that it is firmly "crimped" to the fuze and the joint between the fuze and detonator is "luted"* to exclude the possibility of "flash" passing direct to the detonator.

3. Priming.

Explain that this consists of fitting the igniter set to the grenade. In peace time this must only be done in the priming bay of the live practice range immediately before firing or throwing.

4. Give conditions of test.

* Luting is a form of clay which will be applied to joints to prevent moisture or flash passing to the detonator or fuze (*see Lesson 10, 5*). It is issued to infantry battalions in peace time (2 lb. per annum).

LESSON 3.—THE DISCHARGER

Instructor's Notes

Stores:—

Discharger for each man.

Dummy ballistite cartridge for each man.

1. *Safety precautions.*

Explain that, in order to fire the grenade, the discharger will be attached to the rifle, which is then loaded with a ballistite cartridge, and the grenade placed in the discharger. On the ballistite cartridge being fired, the grenade is discharged.

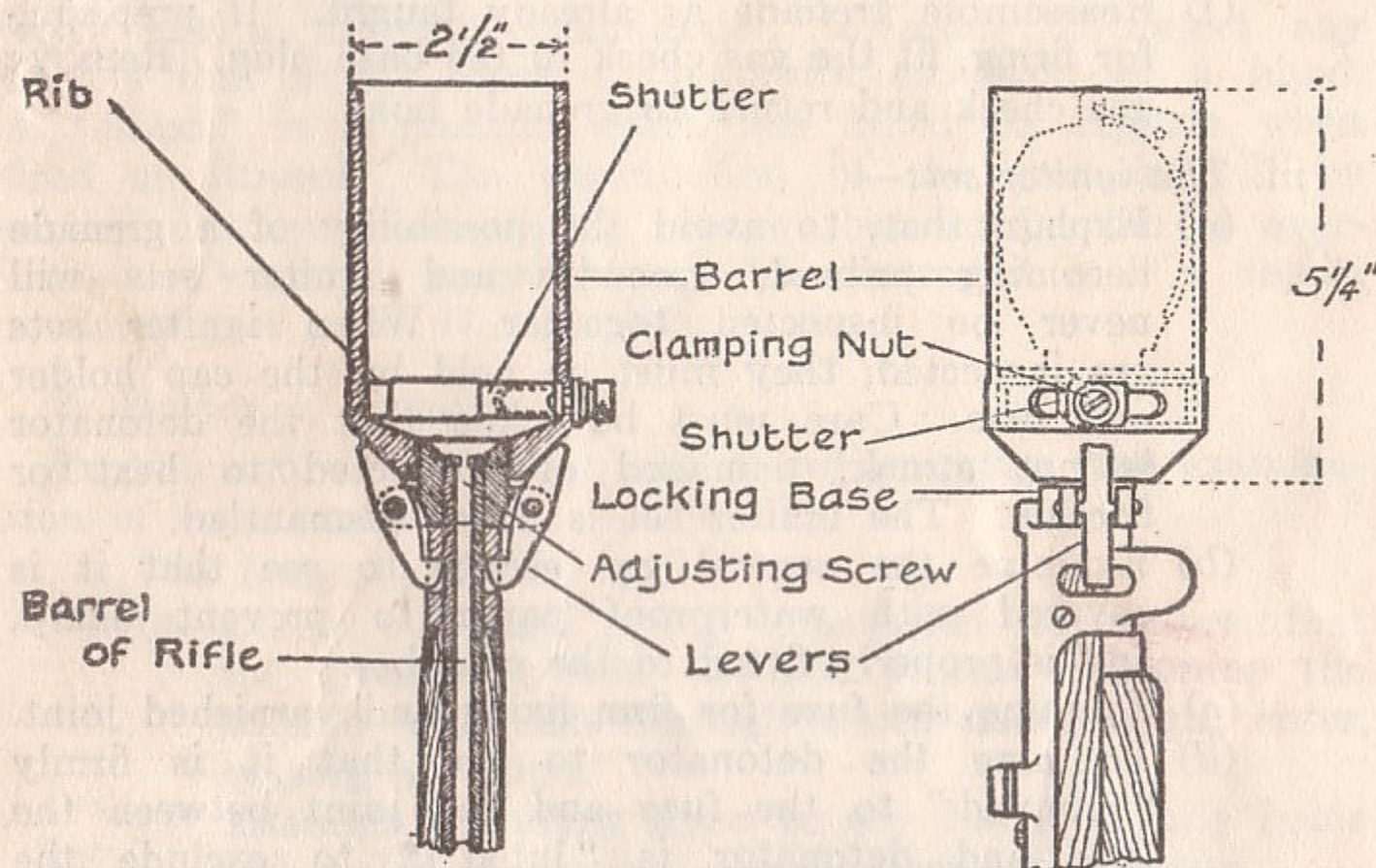


FIG. 3.—The Discharger. The grenade is shown inside the discharger by dotted lines.

There are certain safety precautions to be observed in firing grenades. They are:—

- i. Ballistite cartridge only will be used. Half its length is blackened to distinguish it from other cartridges.
- ii. In no circumstances will ball ammunition be used. Only in great emergency at very close range may ball ammunition be fired through the empty discharger.

- iii. During the firing of a number of grenades there is a possibility of the discharger working loose. It should, therefore, be examined after firing two or three grenades, and readjusted on the rifle if necessary.

2. *Description.*—Explain (see Fig. 3):—

The barrel is cylindrical in shape and is threaded internally to receive the locking base. Near the lower end is a slot which forms the gas port. This is closed by a sliding shutter which can be clamped in position by a clamping nut.

The locking base is threaded on the outside to fit the barrel and with a central hole threaded to receive the adjusting screw, the top of which is slotted to take the point of the bayonet. Below are two claw levers; these engage in the slotted sides of the nose cap.

3. *Fixing and unfixing discharger.*

Explain and demonstrate, with squad imitating (see Fig. 4):

- i. *Fixing discharger.*—Unscrew the locking base about three turns and see that the adjusting screw is also screwed back about $\frac{1}{8}$ inch within the face of the locking base. Place the discharger on the nose cap of rifle so that the large recess in the locking base is towards the bayonet boss. If the fixing is done standing or sitting, the rifle may be held barrel outwards between the knees. With the right hand screw the barrel tightly down to the locking base. Insert the point of the bayonet into the mouth of the barrel, engage it in the slots of the adjusting screw, and screw it in a clockwise direction until it is tight. Finally unscrew one complete turn, after fixing to a cool barrel, to allow for the expansion of the barrel by heat.

Unfixing discharger.—Hold the claw levers as in fixing. Unscrew the discharger two or three turns; slide the thumb and forefinger of the left hand to the upper ends of the claw levers, press inwards and raise the discharger off the nose cap.

ii. *Practise squad.*

4. *Range setting.*

- i. Explain that, in firing H.E. or smoke grenades, the barrel of the rifle must be kept at an angle of 45 degrees. In the case of signal grenades, the rifle will be held at an angle of 70 degrees, with the gas port closed.

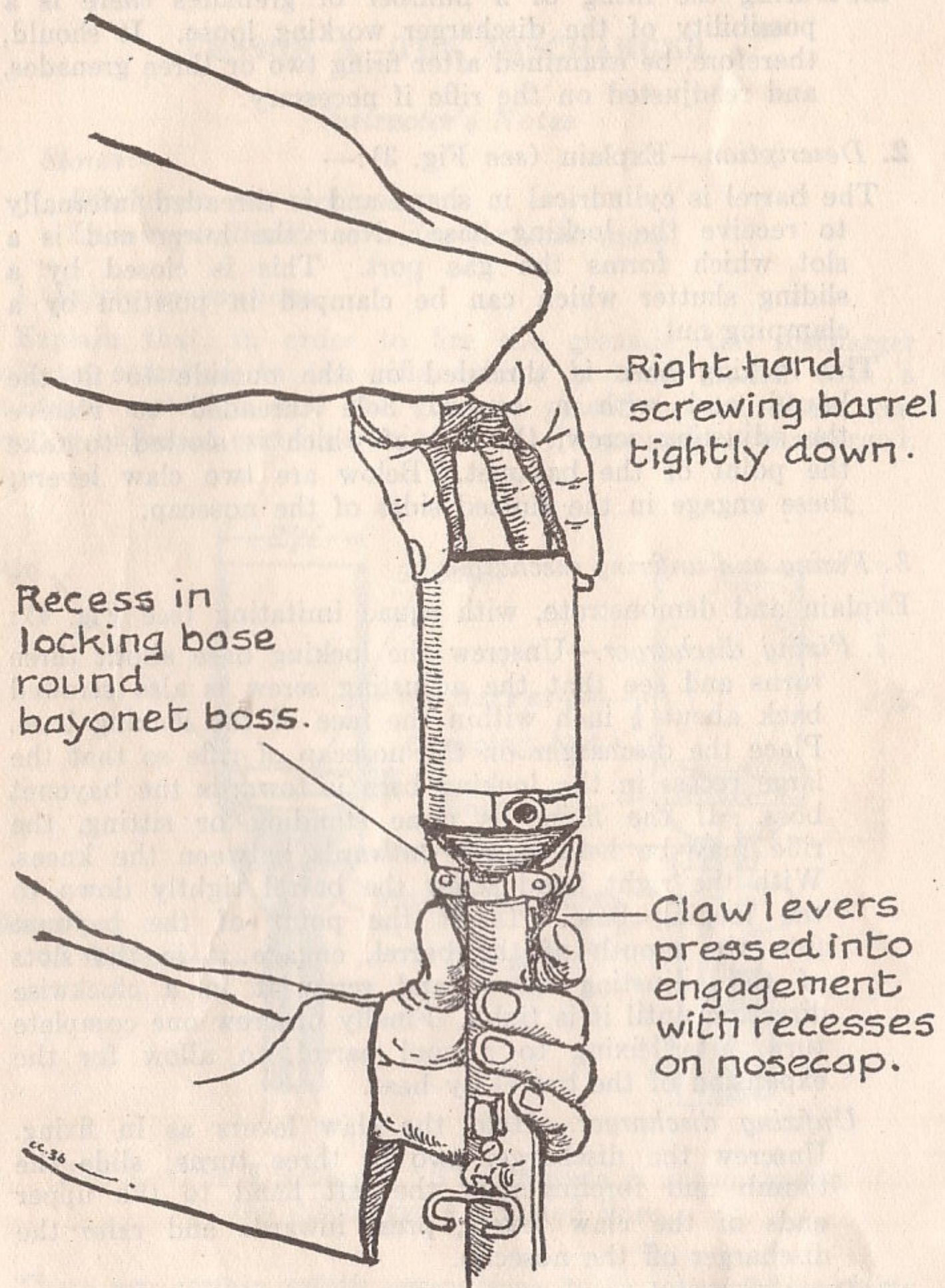


FIG. 4.

Longer or shorter ranges will be obtained by adjustments of the gas port. To obtain extreme range, the gas port will be fully closed, while for the shortest range the gas port will be fully opened. This is due to the fact that the gases behind the grenade are allowed to escape through the gas port instead of having to follow the grenade up through the discharger. The following range table shows the average distances that the grenade will be fired according to the various adjustments made to the gas port:—

Gas port	Range
Fully open..	80 yards
$\frac{3}{4}$ open..	110 "
$\frac{1}{2}$ "	140 "
$\frac{1}{4}$ "	170 "
Fully closed..	200 "

As there are no graduations on the gas port, the firer will have to judge the position of the shutter when adjusting the gas port to the different amounts of opening. A general rule is that each quarter opening of the gas port gives a difference in range of 30 yards.

ii. Explain and demonstrate, with squad imitating, setting ranges. Loosen clamping screw, move shutter to position required, and tighten clamping screw. The measurement must be taken between the inside edge of the shutter and the end of the gas port.

iii. Practise squad.

5. Care and cleaning.

Explain and demonstrate, with squad imitating:—

- Daily.*—When in use, wipe over all parts with a slightly oiled rag.
- After firing.*—Unscrew the locking base and adjusting screw; wipe inside of barrel and surfaces of shutter with dry rag to remove fouling. Then clean with oiled rag, dry and oil. Clean locking base and adjusting screw in the same manner, paying particular attention to threads. Reassemble.
- After a gas attack* the discharger should be cleaned and oiled, particular attention being paid to the threads of the locking base and shutter.

6. Give conditions of test.

SECTION 2.—FIRING INSTRUCTION

(Lessons 4 to 7)

1. As the grenade has a maximum range of 200 yards, it must be fired from behind cover, so that the firer can change to rifle bomber and load. The most convenient position for firing will be adopted, provided that the safety precautions and methods of obtaining accuracy are followed.

2. Once men have gained a reasonable working knowledge of the mechanism of grenades, the bulk of the time available for grenade training will be spent in firing practice, a small proportion only being allotted to throwing.

3. On service it is possible that a pause of several minutes will occur between the action of loading and the moment when fire is required. In order to prevent rifle bombers remaining in the strained position of the "aim," the command "Prepare to fire" will be used by section commanders to indicate the moment when aim is to be taken.

4. When an order is given to a rifle bomber to load, unless the type of grenade is specifically mentioned, H.E. will be used.

LESSON 4.—FIRING POSITIONS

Instructor's Notes

Stores:—

Rifle, bayonet, dummies, ground sheets, discharger	} for instructor and each man.
Dummy grenade H.E. with gas check, one round dummy ballistite	

This lesson must be taught behind kneeling cover.

Extend squad, carry out first safety precaution and final fitting and return discharger and grenade to haversack. Fix bayonets. Select targets. Order "Standing—Load"—"Rest." Squad on right of cover.

Explain para. 1, page 16.

The two positions most likely to be used for firing the grenade are those of kneeling and sitting. These will be demonstrated and taught in this lesson.

1. Prepare for loading.

Explain and demonstrate from "position of observation," kneeling behind cover on the order "Rifle bomber"—"Range"—"Load."

i. Changing to rifle bomber.—Get down behind cover—safety catch forward, close cut-off (if none, unload)—unload ball cartridge and load ballistite—apply safety catch—draw the rifle back, keeping the bolt clear of the ground—unfix bayonet and fix discharger—set range.

ii. Loading grenade.—Take a grenade. See that the gas check is tight by screwing it up. Place the grenade in the discharger, ensuring that the lever is inside it. Hold the grenade with the left hand so that the pin can be withdrawn with the right hand. Withdraw the pin, which must be retained on the finger until the grenade has been fired. Press the grenade fully down. Hold the rifle, pointed to the front, at an angle sufficient to prevent the grenade from falling out of the discharger (see Figs. 5 and 6).

iii. Unloading without firing.—Explain that on service this will seldom occur but may occasionally be required.—Apply safety catch. With the left hand withdraw the grenade sufficiently far from the discharger for the pin to be put back. Hold the grenade in this position with



FIG. 5.—Loading Grenade.

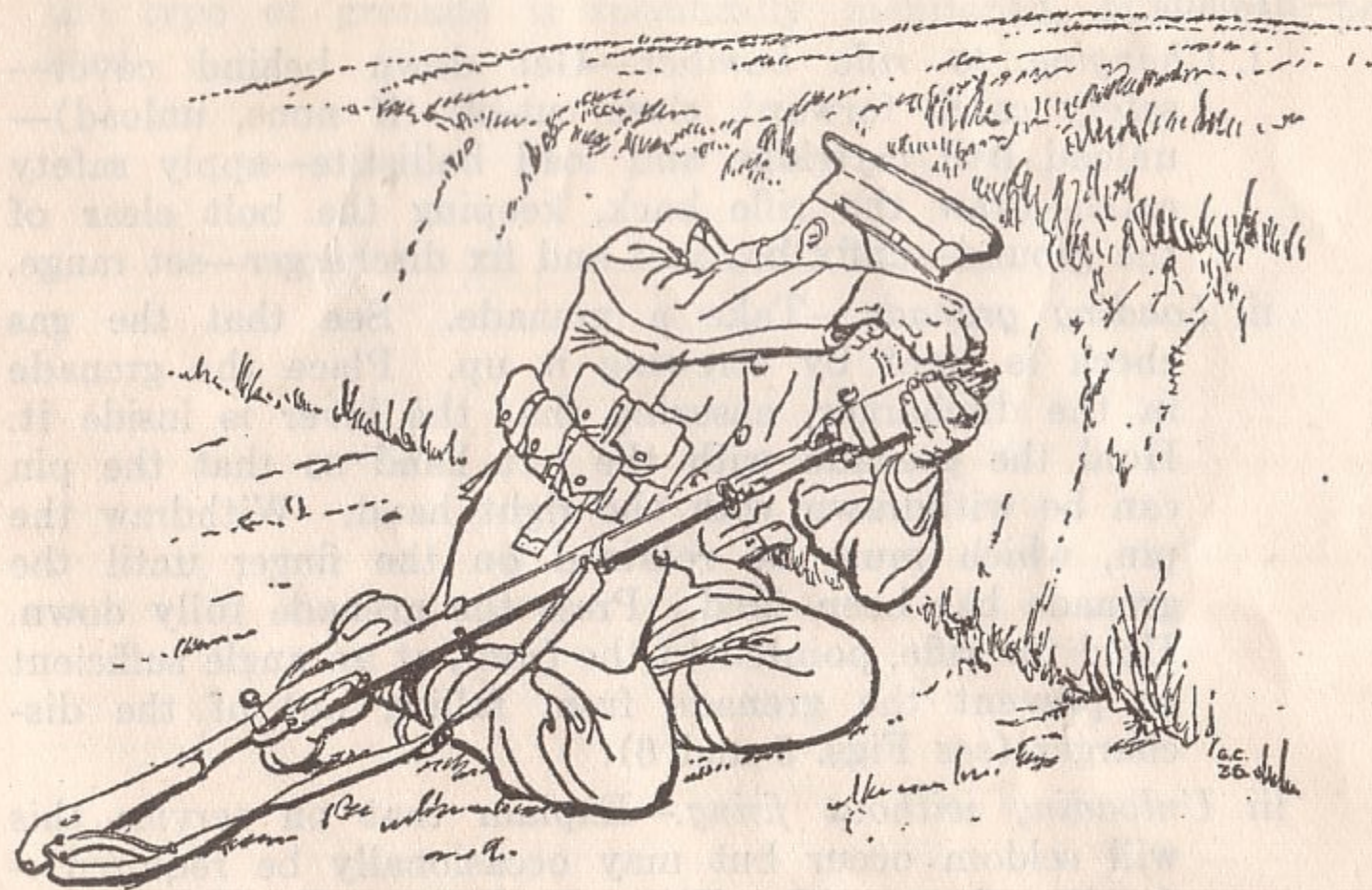


FIG. 6.—Withdrawing Pin.

the thumb and forefinger, and support the discharger with the remaining fingers. Replace the pin and unload the grenade from the discharger. Splay the pin on the edge of the discharger and return the grenade to the haversack.

Except for trigger finger,
Hands clear
of all metal.

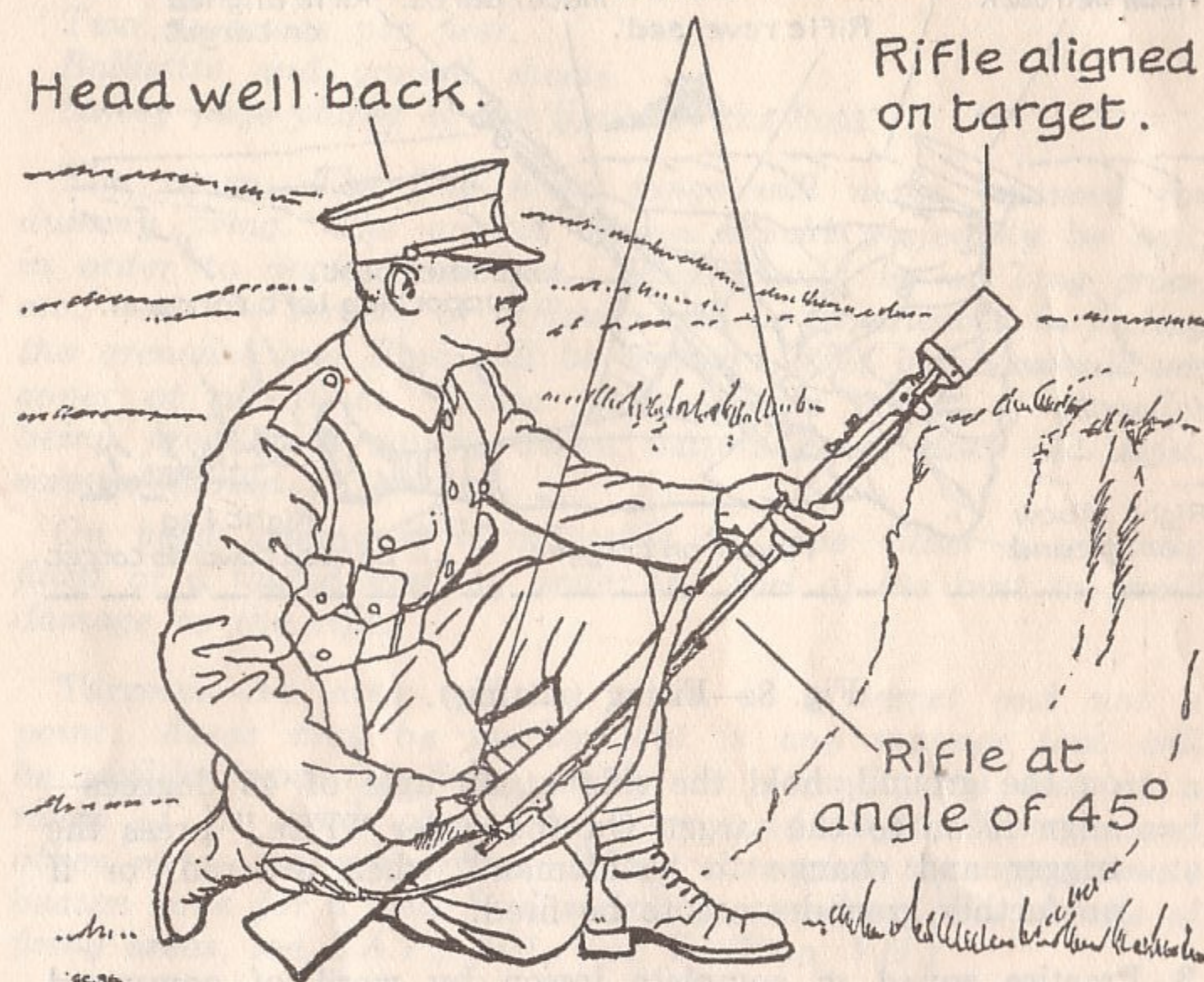


Fig. 7.—Firing (kneeling).

- iv. *Changing to rifleman.*—On the command "Rifleman," unfix discharger, return to haversack—fix bayonet—push rifle forward—unload ballistite—load ball cartridge—apply safety catch—return to "position of observation."
- v. Practise squad by word of command: "Position of observation behind cover"—"rifle bomber"—"Range"—"Load"—"Without firing unload"—"Rifleman."
- vi. Give conditions of test.

2. *Firing.* (In this phase there will be no loading with grenades.)

Explain and demonstrate (see Figs. 7 and 8):—

On the order "Prepare to fire," adopt a position from which the target can be seen (kneeling or sitting)—push forward safety catch—clench the fist of the right hand and put forefinger on the trigger. With the heel of the butt

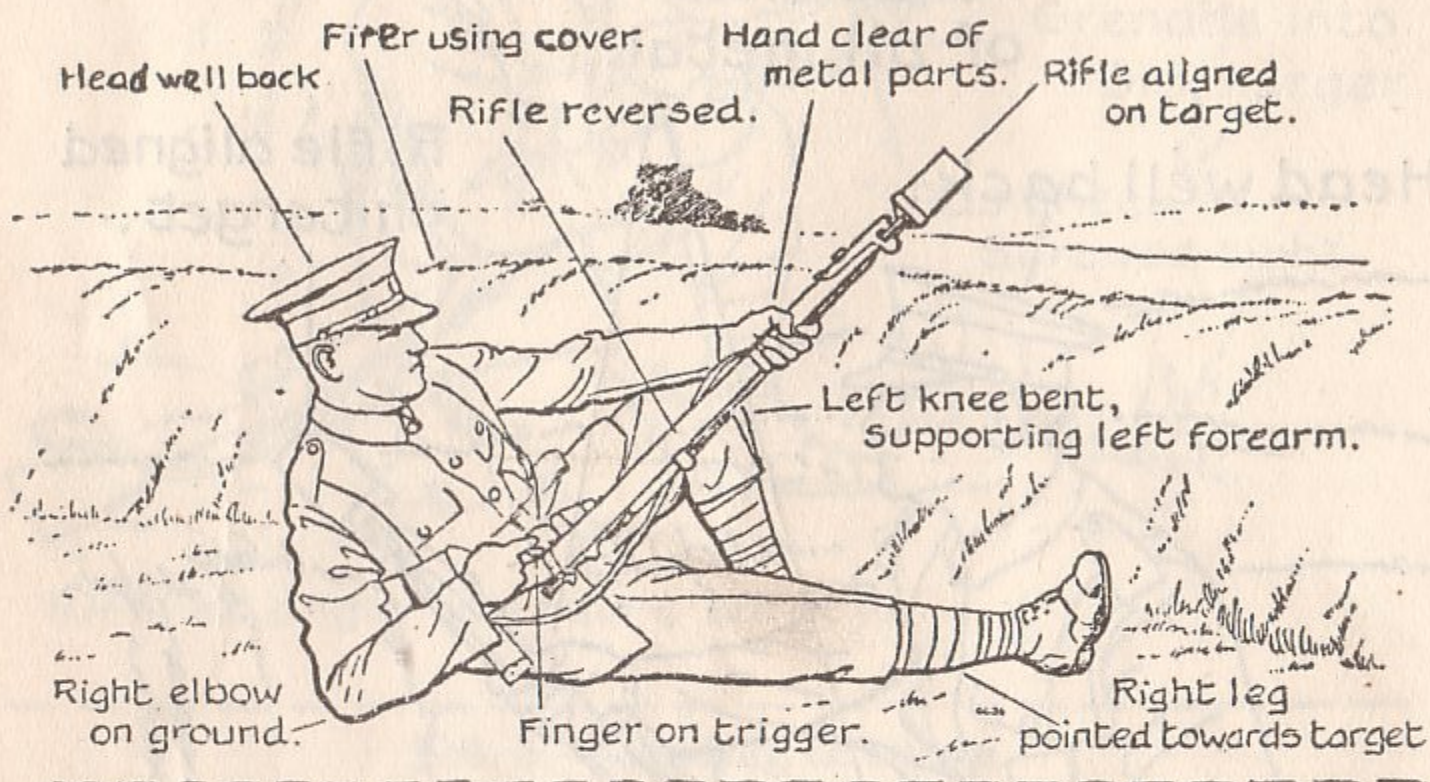


Fig. 8.—Firing (sitting).

on the ground, hold the rifle at an angle of 45 degrees—align it on to the target. On the order "Fire," press the trigger and change to "Rifleman" when ordered, or if no further grenades are to be fired.

3. Practise squad in complete lesson by word of command (without dummy grenades).

Commands:—"Position of observation behind cover"—"Rifle bomber"—"Range"—"Load"—"Prepare to fire"—"Fire"—"Rifleman."

LESSON 5.—FIRING DUMMY GRENADES (H.E.)

Instructor's Notes

Stores:—

Suitable targets clearly marked.
E.Y. rifles and dischargers (two on each firing point).
Screens to represent cover.
Two dummies per firer.
Ballistite and ground sheets.
Safety flags placed at the limits of the area.

The range.—The live firing range will never be used for dummy firing. The ground chosen should preferably be soft, in order to avoid breakages. There should be no long grass, etc., near the targets, or difficulty will be experienced in finding the grenades and time will be wasted. Rifle bombers will use cover at all times. Firing points should admit of grenades being fired from cover; where natural cover does not exist, screens should be erected.

On hard ground it is advisable to have either a partially filled or a folded sandbag under the heel of the butt to avoid damage to the rifle.

Targets.—An area will be given as a target and not a point. Areas may be marked out in any manner that will be visible from the firing point. As a guide, the area at a range of 150 yards should be a circle of 40 ft. diameter and other ranges in proportion. These sizes give the approximate beaten zone for a well fired series of grenades. (For details of firing areas, see S.A.T., 1931, Vol. V, Chap. VII.)

The number of grenades which can be fired by each detail will depend on circumstances, but two should be considered the minimum. Details may repeat the practice as often as time permits. Recovery of grenades will only be carried out by order of the senior officer or N.C.O. present.

During firing, the instructor will ask the firer the correction to be made, if any, after each grenade is fired.

No correction for range will be made unless the instructor is satisfied that the angle of the rifle was 45 degrees.

Instructors on the firing points will discuss the question of wind allowances, but, so far as possible, they will get the man to make his own estimate.

Apart from the wind, errors in direction may be due to two causes:—

- i. *Faulty alignment*—most common in the kneeling position, the tendency being to throw grenades to the left.
- ii. *Flinching*—the tendency being to throw grenades to the right.

1. Range discipline.

Explain that discipline on the range is the same as on the rifle range. Particular attention will be paid to the following:—

Only the instructor and the detail firing will be on the firing point.

The next detail to fire will wait about five yards in rear of the firing point.

The remainder of the squad will be not less than ten yards in rear.

No man will fire without a direct order.

2. Position of details.

Form up section in rear of the firing point and give out order of firing. Order details to assume positions given in 1 above.

3. Give conditions of test.

4. Firing.

Each man will "load" a grenade and "fire" on the order of his immediate commander. Explain that, on the command "Unload" the firer will unload his rifle, close the gas port and stand up.

5. Criticism after firing.

Discuss with the firer the direction, wind allowance and any errors or corrections made.

LESSON 6.—SMOKE AND SIGNAL GRENADES

Instructor's Notes

Stores:—

Discharger
One round ballistite } for each man and instructor.
One smoke grenade }

One of each type of signal grenades.

The employment of smoke and the method of building up a smoke screen will be dealt with in the next lesson. This lesson deals with the description of smoke and signal grenades and the method of firing them.

1. Description of smoke grenade.

Explain that the body is filled with smoke composition, primed at the open end. In the middle of the latter is a delay pellet, which prevents smoke emission for five seconds while the grenade is in flight.

2. Action when the smoke grenade is fired.

Explain (using a grenade) that, when the rifle is fired the flash from the ballistite cartridge with which the rifle is loaded penetrates the tinned-plate sealing discs and ignites the delay pellet.

After falling to the ground, the grenade gives off dense smoke for a period of approximately one minute.

3. Loading and unloading without firing (smoke grenade).

Order "Rifle bomber"—"Range"—"Smoke—Load."

Explain and demonstrate, with squad imitating:—

i. *To load grenade*.—Hold the grenade base downwards. The top of the grenade is marked "TOP." Pull off the cap by means of the loop and insert the grenade in the discharger. Put the cap in a convenient place.

ii. *To unload without firing*.—Unscrew discharger, shake out the grenade and replace the cap—Return to "Rifleman."

iii. Practise squad.

4. Firing.

Explain that the same action as already taught in Lesson 4, H.E. grenades, will be carried out.

5. Practise squad.

6. Signal grenades.*

i. Explain:—Signal grenades giving various combinations of colours are fired, with the rifle at an angle of 70 degrees, in the same way as smoke grenades. Each type is marked on the body to show the colour of the signal, and its suitability for day or night use. Grenades are packed in boxes marked with colour signs corresponding to the contents; ballistite cartridges required for firing are included.

ii. Show each type of signal grenade and point out the markings.

*Signal grenades for use by day are distinguished from others by a serpentine marking. Those suitable for use by day and night, or by night only, are marked with the colours of the signal. Boxes in which the signal grenades are packed are similarly marked.

LESSON 7.—EMPLOYMENT OF SMOKE GRENADES

*Instructor's Notes**Stores:—*

Blackboard and chalk.

Suitable target areas and cover.

E. Y. rifle, discharger, smoke grenades and ballistite.

Smoke candles as required.

Fatiguemen.

Instructions for firing smoke grenades follow those laid down for firing dummy grenades. The following points need special attention:

- i. *The target site should be non-inflammatory as, although the smoke grenade is non-incendiary, yet heat is engendered in the case by the burning of the smoke composition and this may cause fire if it comes in contact with inflammable substances. In any case, after live smoke grenades have been fired, the ground should be inspected for any possible smouldering fires.*
- ii. *In order that the best value may be obtained from the small number of live smoke grenades that are available, the firers should constantly be questioned on the principles explained below, and range and wind corrections, as necessary, made after discussion with the firer.*

1. Introduction.

- i. Explain that the object of using smoke in battle is to deny to the enemy the power of observation or aimed fire, or both, without hampering the action of our own troops.
- ii. The following considerations affecting the use of smoke will be explained.—Only a limited number of smoke grenades can be carried; therefore their employment must be carefully worked out and they must be used sparingly and systematically. The direction and strength of the wind is of primary importance.

(a) A side or cross wind is the most favourable and requires the least number of grenades. Three or four grenades fired by a single firer should normally be sufficient for a platoon operation and are enough to provide a screen lasting some three or four minutes (see Fig. 9).

- (b) If the wind is blowing towards the point to be blinded, a larger number of grenades will be required. These should be placed in front of the position and about 100 yards short. This allows the smoke to "fish-tail" and so increases the width of the screen. Two grenades about 10 yards apart will effectively blind a small post (see Fig. 10).
- (c) If the wind is blowing from the point to be blinded, it is inadvisable to use smoke.

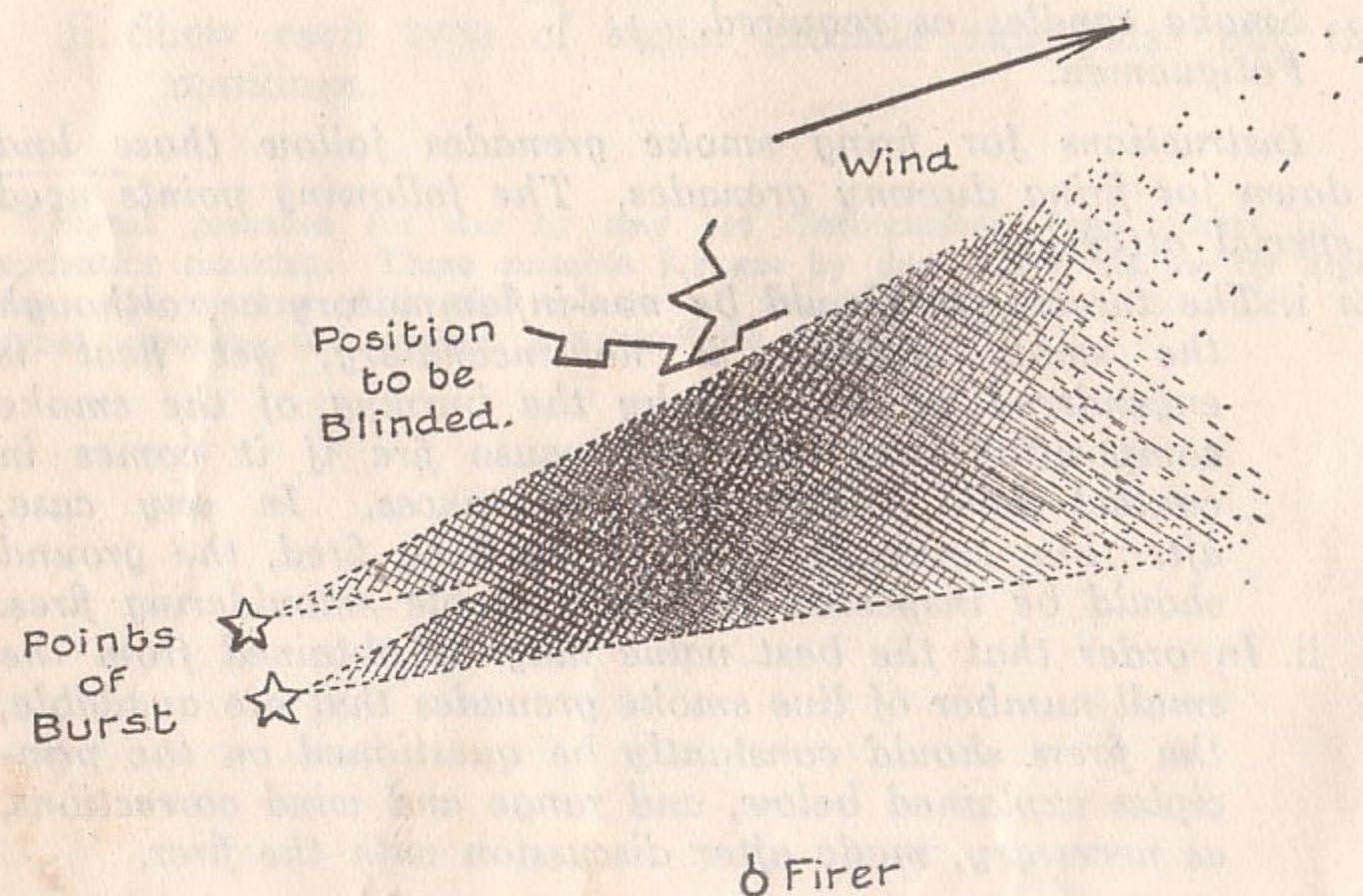


FIG. 9.—Employment of Smoke Grenades (Side or Cross Wind).

2. Method of firing a smoke screen.

Explain:—

- i. The screen should be started by firing two grenades as quickly as possible. To make this easier, the second grenade and ballistite should be placed on the ground beside the firer. As the smoke cloud does not reach its maximum density at once, the grenades should be burst about 50 yards upwind of the area to be blinded.
- ii. The screen should be fed at intervals of 30 seconds under ordinary conditions of a cross wind. Should an exceptionally high wind be blowing, the rate of feed must be increased according to the firer's observation.

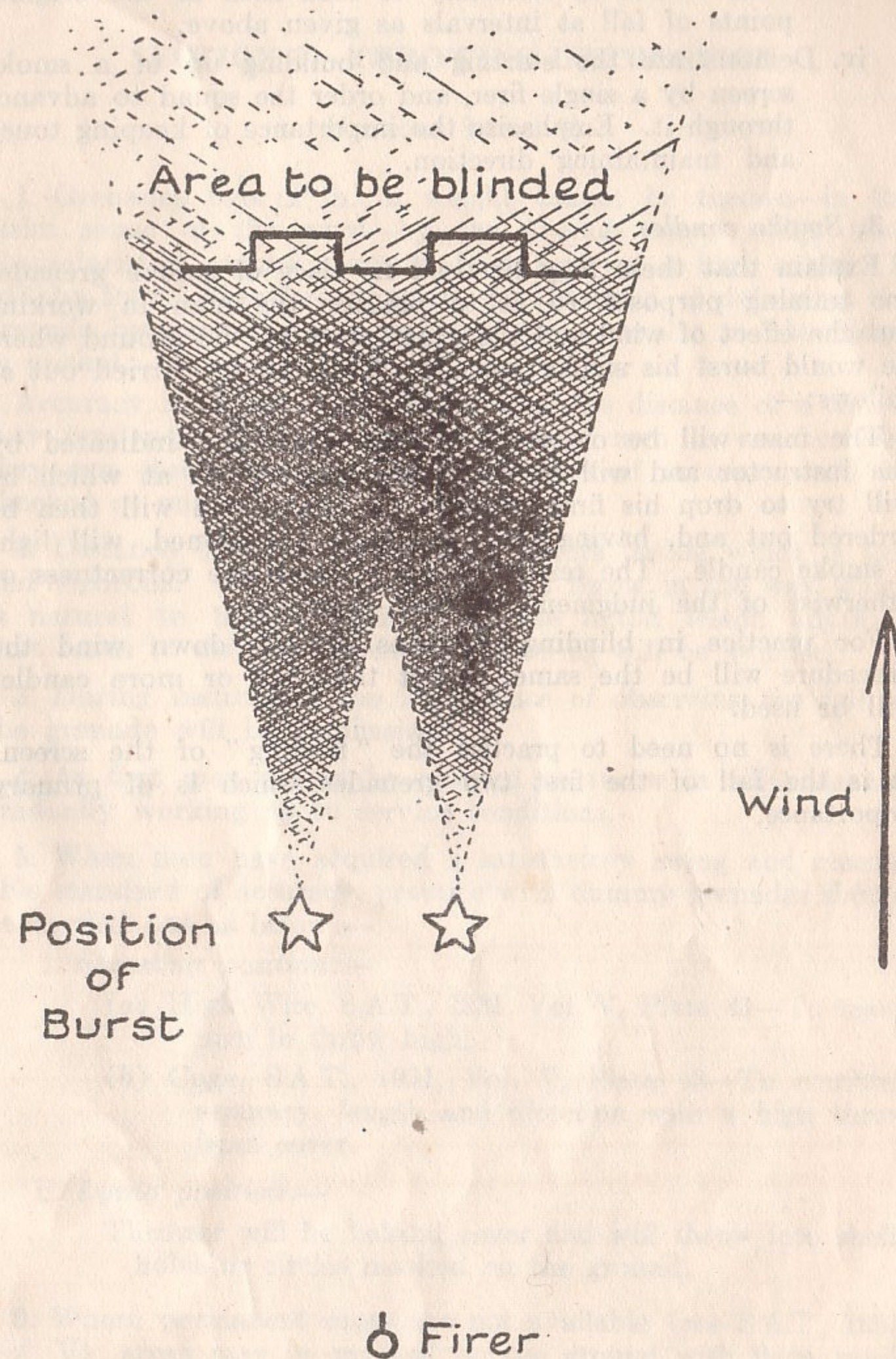


FIG. 10.—Area to be blinded.

- iii. In maintaining a screen covering a target directly down wind it will be necessary to feed each of the original points of fall at intervals as given above.
- iv. Demonstrate the starting and building up of a smoke screen by a single firer, and order the squad to advance through it. Emphasize the importance of keeping touch and maintaining direction.

3. *Smoke candles.*

Explain that these may be used in place of smoke grenades for training purposes, so as to practise the man in working out the effect of wind and the exact place on the ground where he would burst his smoke grenade. This can be carried out as follows:—

The man will be ordered to blind a position indicated by the instructor and will be asked the exact point at which he will try to drop his first grenade. A fatiguer will then be ordered out and, having been accurately positioned, will light a smoke candle. The resultant cloud proves the correctness or otherwise of the judgment of wind direction.

For practice in blinding positions directly down wind the procedure will be the same, except that two or more candles will be used.

There is no need to practise the "feeding" of the screen. It is the fall of the first two grenades which is of primary importance.

SECTION 3.—THROWING INSTRUCTION

(Lessons 8 and 9)

1. Grenades over 1 lb. in weight cannot be thrown—in the strict sense of the word—by the average man, whilst their characteristics require them to be thrown at a high angle. It will be found, therefore, that the best method of delivering the grenade by hand is by an overarm swing, similar to "bowling" in cricket.

Accuracy is of more importance than the distance of a throw. Any tendency, therefore, on the part of men to see how far they can throw the grenade, irrespective of accuracy, will be checked at once.

2. Distance depends mainly on a natural swing which is free and vigorous. Men will be allowed to throw in the way which is natural to them. Apart from the initial lesson anything that tends to drill movements in throwing will be avoided.

3. During instruction the importance of observing the fall of the grenade will be emphasized.

4. At first men should be allowed to throw in shirt sleeves, gradually working up to service conditions.

5. When men have acquired a satisfactory swing and reasonable standard of accuracy, practice with dummy grenades should be carried out as below:—

i. *Standing position:*—

(a) High Wire, S.A.T., 1931, Vol. V, Plate 41—To teach men to throw high.

(b) Cage, S.A.T., 1931, Vol. V, Plate 43—To combine accuracy, length and direction with a high throw from cover.

ii. *Lying position:*—

Thrower will be behind cover and will throw into shell-holes or circles marked on the ground.

6. Where permanent cages are not available (see S.A.T., 1931, Vol. V), areas may be marked on the ground with flags, sand-bags or similar means. In place of the high wire, goal posts make a good substitute, and six-foot tables standing on end provide cover of a suitable height.

LESSON 8.—STANDING POSITION

Instructor's Notes

Stores:—

Two dummy grenades for each man.

Squad in shirt sleeves. Issue grenades and carry out the first safety precaution.

Men should be taught as soon as possible to observe the fall of the grenade for themselves. In the early training, the instructor will give the corrections.

When throwing from the various distance circles over the high wire, the throwers should be arranged in echelon, so that those behind do not endanger those in front.

If the thrower is left-handed, the instructions as to which hand should be used will be reversed.

The following precautions will be taken in throwing dummy grenades:—

Only one man will throw at a time, except when imitating instructor in first throw, when all men throw together.

No man will throw without a direct order.

Grenades will never be thrown from man to man.

No man will attempt to catch a grenade.

No man will pick up a grenade which has been thrown until ordered to do so.

1. Explain that the standing position is used to throw from a trench or from behind high cover.

2. Demonstrate and repeat with detail, squad imitating (see Figs. 11 to 14).

i. *Ready position.*—Pick up a grenade. Hold it in the right hand, base downwards, the lever under the base of the fingers, the thumb just below the filling screw gripping it firmly. Place the first or second finger of the left hand through the ring of the safety pin—the hands with the knuckles uppermost and close to the waist. Face the target, turn to the right and balance the body by carrying off the left foot towards the target.

ii. *Prepare to throw.*—Keeping the left arm still and close to the body, withdraw the pin (during practice go through the action of withdrawing the pin) by thrusting the right hand downwards and backwards. Glance at the shoulders of the grenade to see that the whole pin has been drawn out. Keep the pin until the grenade has been thrown.

iii. *Throw.*—Fix the eyes on, or in the direction of the target, keeping the left shoulder pointing at the target. Slightly bend the knees. Swing back as far as possible, allowing the left arm (and foot if necessary) to come up naturally. Without a pause swing quickly forward, keeping the right arm upright and deliver the grenade.

3. Give conditions of test.

4. Without using grenades, men practise individually throwing action only, whilst instructor supervises each man in turn throwing two grenades.

Body turned to right.

First finger in ring.

Eyes on target.

Firm grip.

Hands close to body.

Feet apart.

FIG. 11.—Ready Position

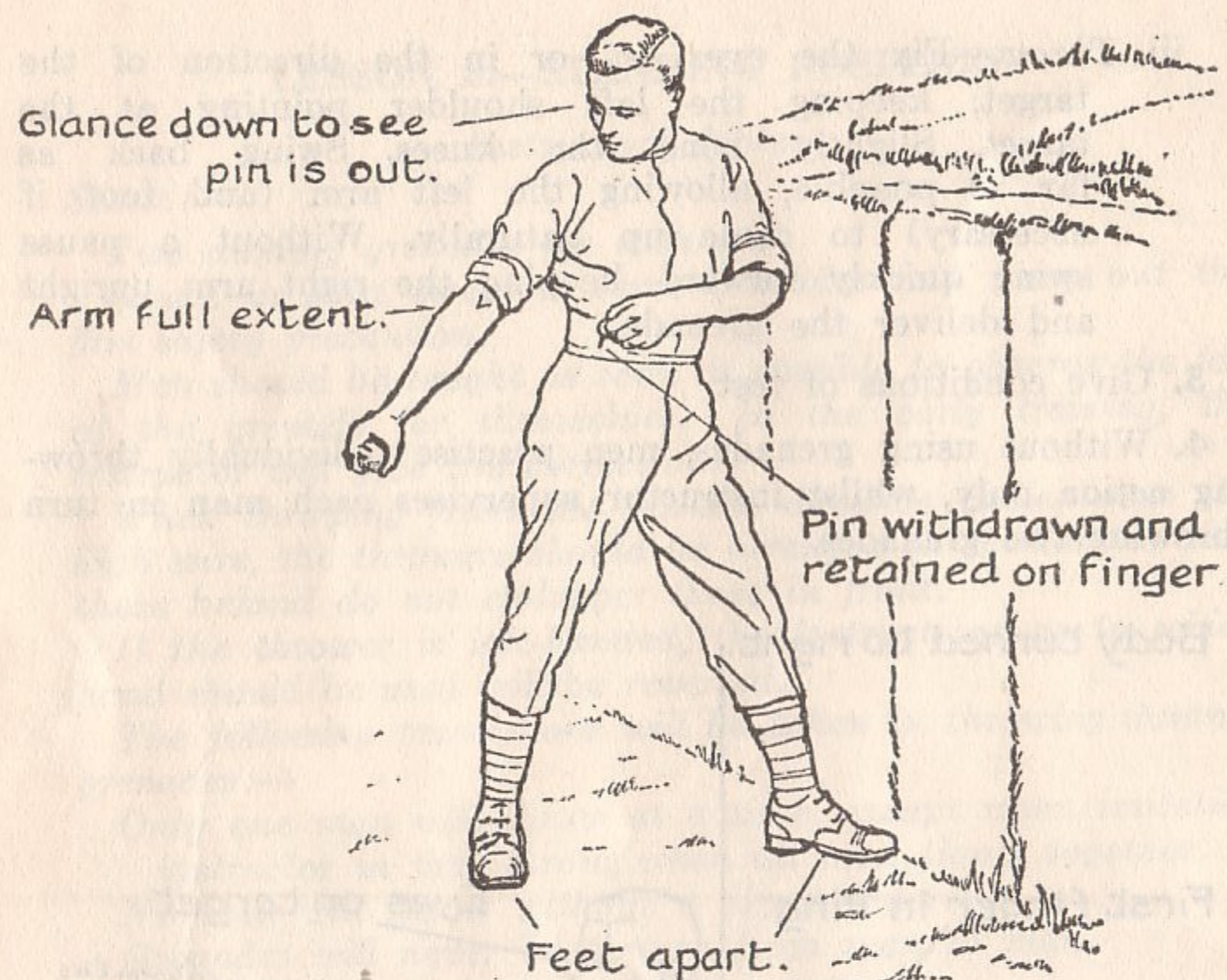


FIG. 12.—Prepare to throw.

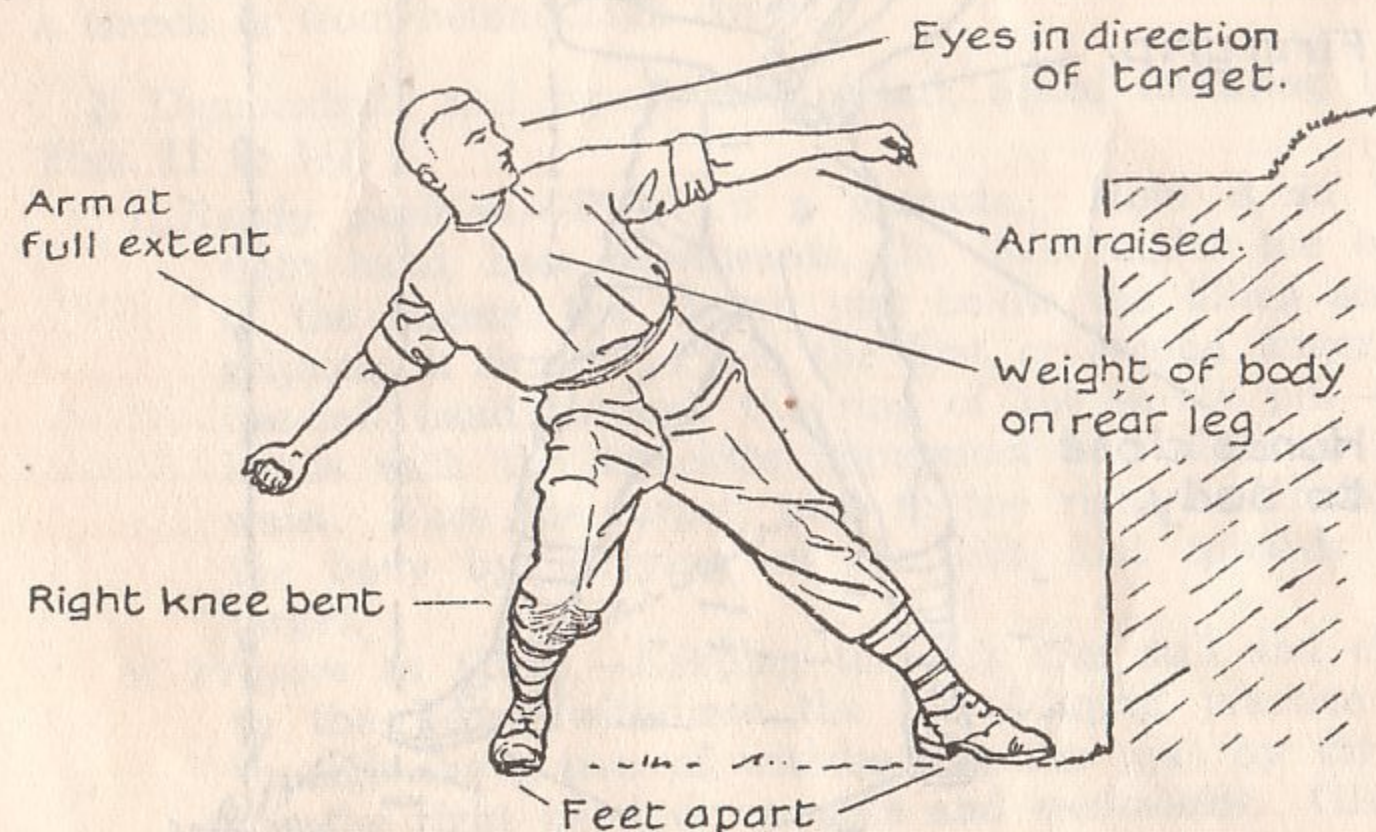


FIG. 13.—Position before throwing.

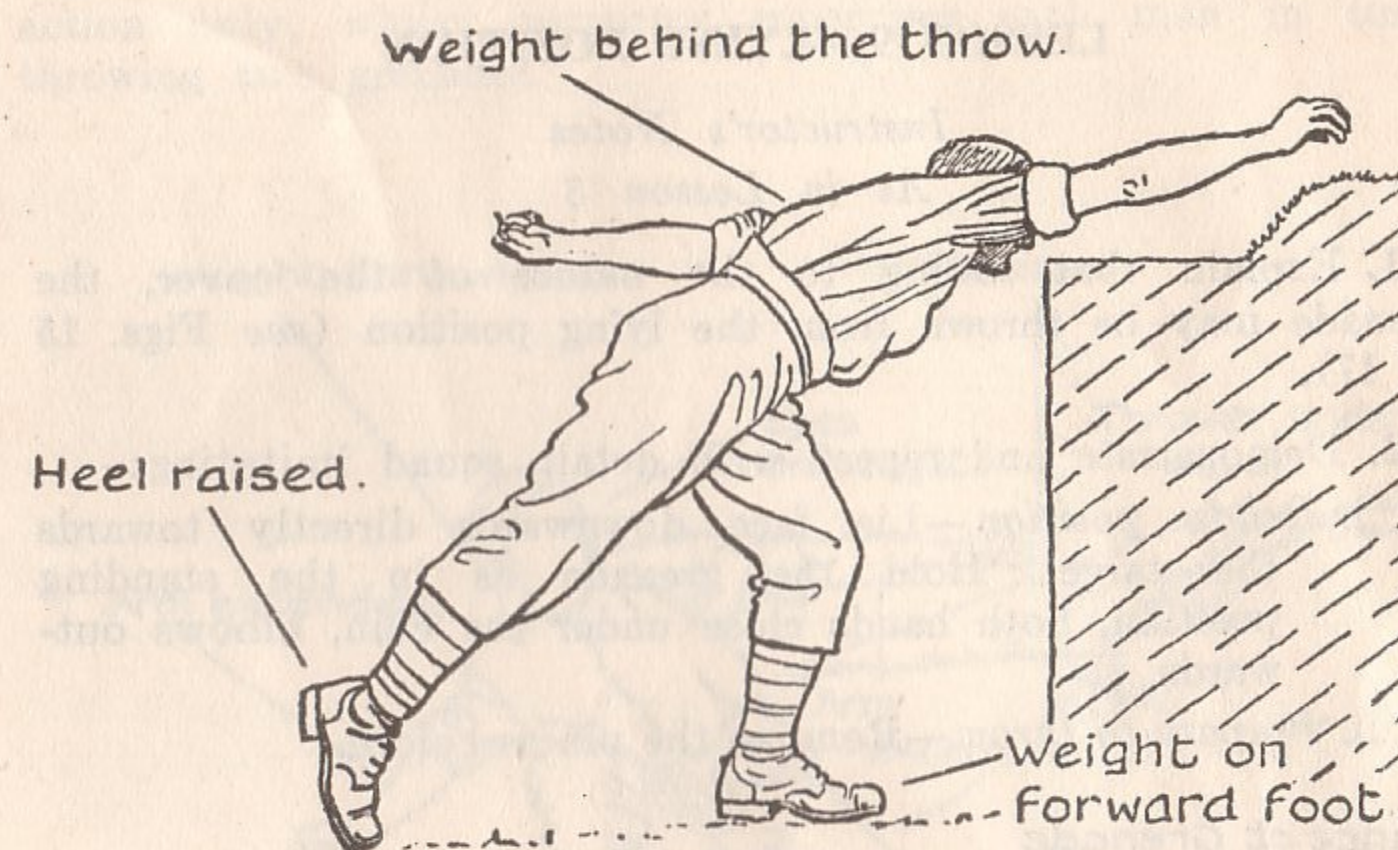


FIG. 14.—Position after throwing.

LESSON 9.—LYING POSITION

Instructor's Notes

As in Lesson 8

1. Explain that, owing to the nature of the cover, the grenade may be thrown from the lying position (see Figs. 15 to 17).

2. Demonstrate and repeat with detail, squad imitating:—

i. *Ready position.*—Lie face downwards directly towards the target. Hold the grenade as in the standing position, both hands close under the chin, elbows outwards.

ii. *Prepare to throw.*—Remove the pin as before.

Glance at Grenade
to see pin is out.

Feet together.

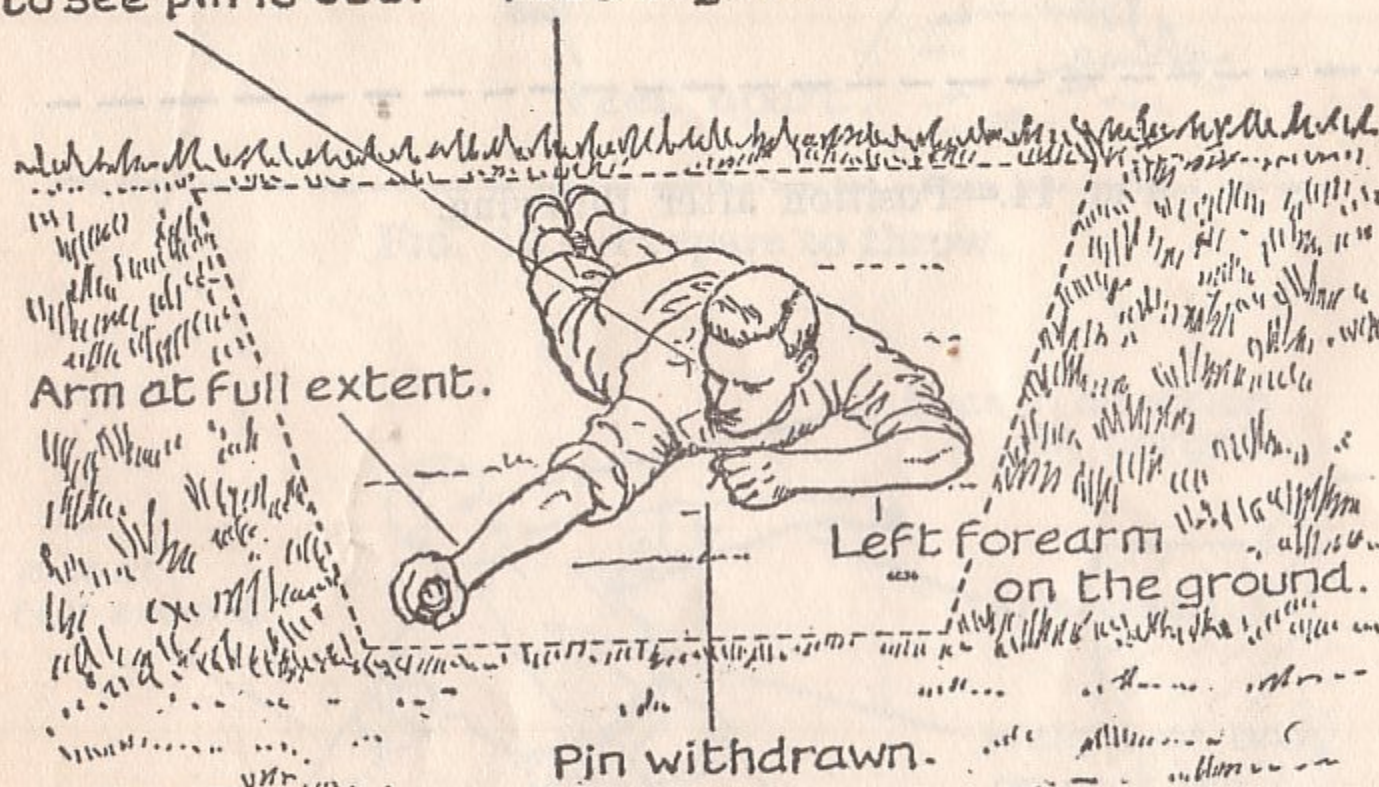


FIG. 15.—Prepare to throw

iii. *Throwing.*—Place the hands in a natural position for pressing up, keeping the pin in the left hand. Press quickly up. Keeping the left knee on the ground, swing the body quickly back, allowing the left arm to come up and the right leg to go back naturally. Keeping the eyes and left shoulder on the line of the target, swing forward, right arm as upright as possible, and deliver the grenade. Observe the fall of the grenade. Quickly lie down.

3. Without using grenades, men practise individually throwing action only, whilst instructor supervises each man in turn throwing two grenades.

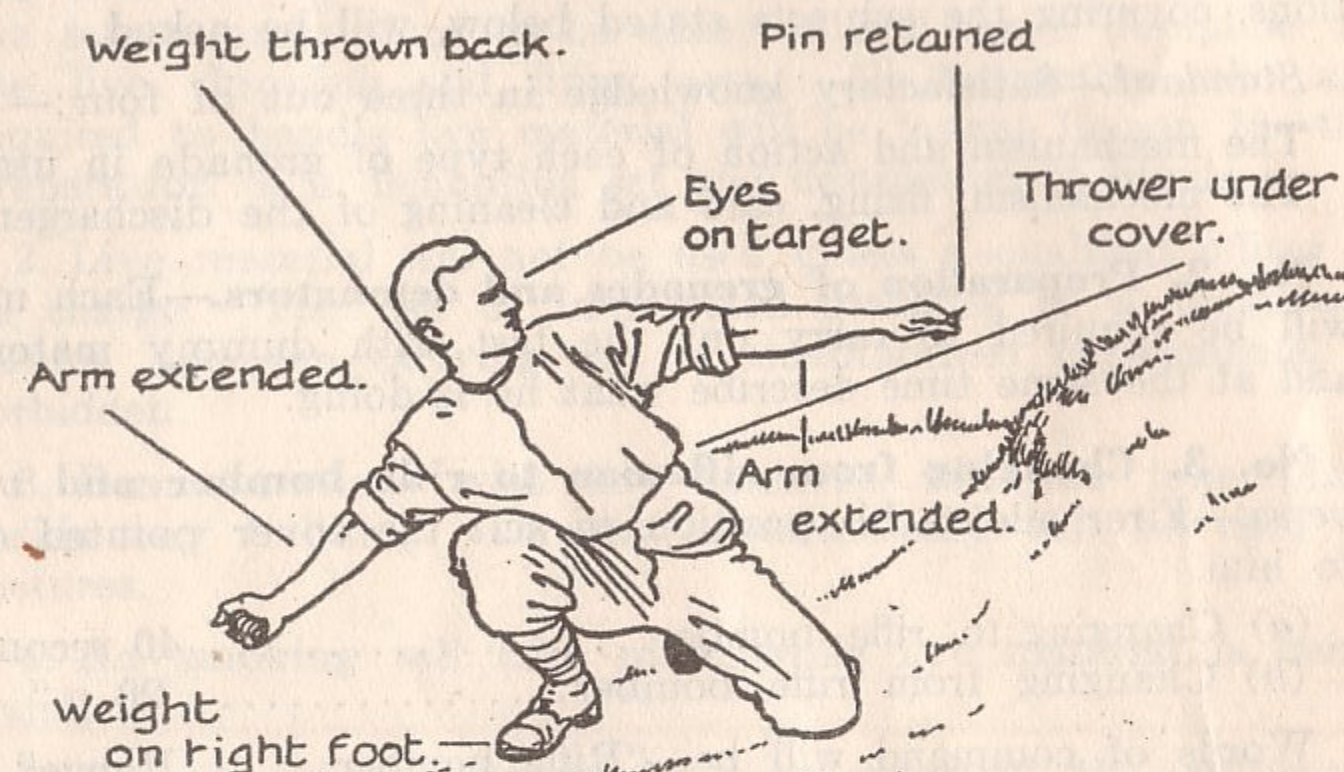


FIG. 16.—Position when throwing.

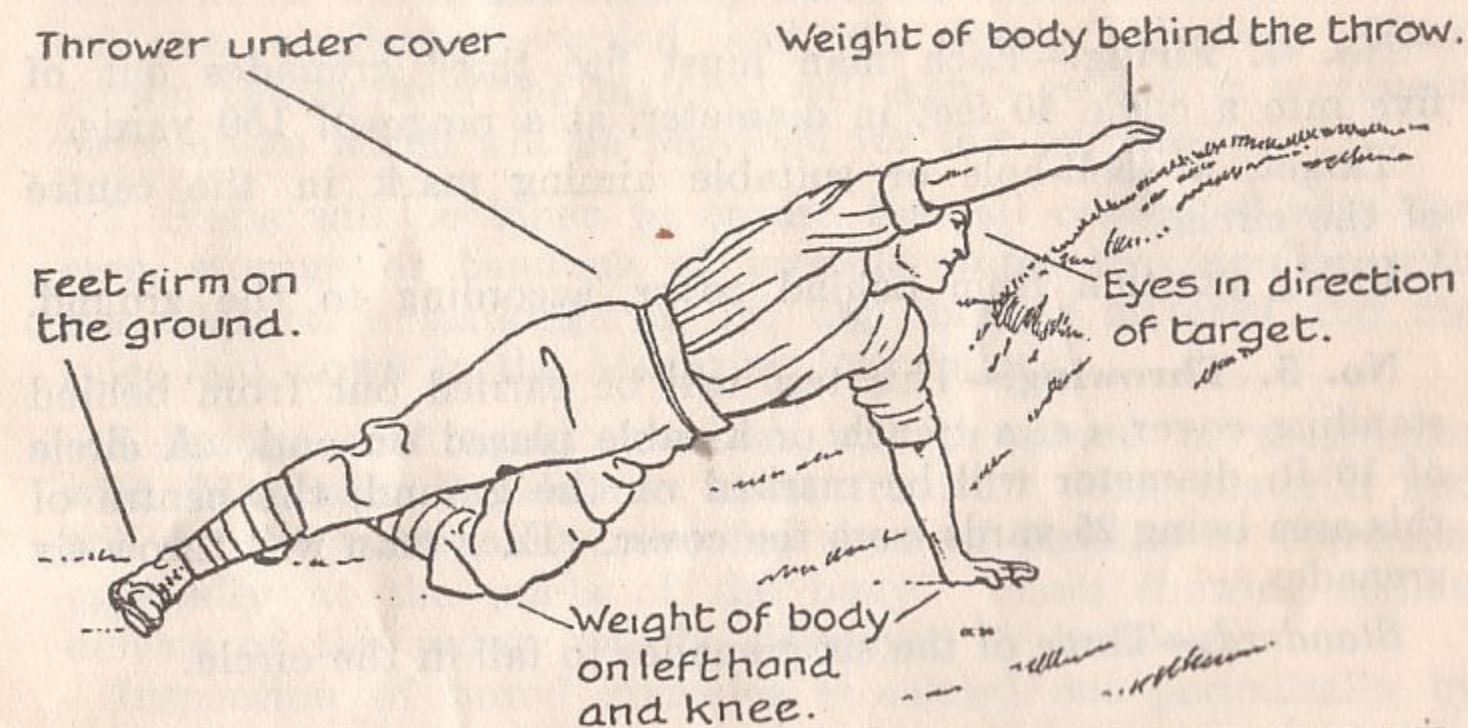


FIG. 17.—Position after throwing.

TESTS OF ELEMENTARY TRAINING

No. 1. Mechanism, care and cleaning.—A total of four questions, covering the subjects stated below, will be asked.

Standard.—Satisfactory knowledge in three out of four:—

The mechanism and action of each type of grenade in use.
The mechanism, fixing, care and cleaning of the discharger.

No. 2. Preparation of grenades and detonators.—Each man will be required to carry out the test with dummy material and at the same time describe what he is doing.

No. 3. Changing from rifleman to rifle bomber and vice versa.—Firer adapts his position to suit the cover pointed out to him.

(a) Changing to rifle bomber..... 40 seconds.
(b) Changing from rifle bomber..... 20 "

Words of command will be—"Rifle bomber . . . Range" or "Rifleman."

The time will be taken from the moment of giving the order until the change is completed.

Standard.—Position in each case must be correct after change and the man making full use of cover.

No. 4. Firing.—Each man must fire three grenades out of five into a circle 40 feet in diameter, at a range of 150 yards.

Target, a shell-hole or suitable aiming mark in the centre of the circle.

Firing position from behind cover, according to the ground.

No. 5. Throwing.—This test will be carried out from behind standing cover, i.e. a trench or a table placed on end. A circle of 10 ft. diameter will be marked on the ground, the centre of this area being 25 yards from the cover. Each man will throw six grenades.

Standard.—Three of the six grenades to fall in the circle.

SECTION 4.—TRAINING WITH LIVE GRENADES

1. This section deals with training in the use of live grenades, the safety precautions to be observed and range discipline on the live throwing and firing area. All instructors who are required to handle live material will be taught Lesson 10—the preparation of a demolition set and destruction of blinds.

2. Live material will not be used unless a qualified officer is in charge. The use of improvised grenades of a dangerous nature, and the carrying out of unauthorized experiments, is forbidden.

3. Demonstrations with live material will not take place inside any building. Dummy material only will be used at lectures.

4. No smoking will take place while live material is being handled.

5. Should a primed grenade not be expended, the igniter set will be at once removed and returned to its box. Particular care will be taken that no grenade is returned to store primed.

6. A book will be kept in which the numbers of grenades, igniter sets and gun-cotton primers drawn from store will be recorded in words and figures; numbers expended and returned will be similarly recorded and the totals balanced. Each person taking over the material will sign a receipt in a column or columns which will be provided for this purpose.

7. Steps will be taken to ensure that all concerned with the care, storage or handling of grenade stores are familiar with the distinctive markings of live and dummy material and the rules laid down in the Magazine Regulations.

8. Smoke and signal grenades will be stored in accordance with Magazine Regulations apart from all other material and will be frequently inspected for signs of leakage or corrosion, especially at the joints of the body. Those showing serious defects of this nature will be destroyed by burning.

Inspection of boxed grenades is carried out periodically by inspecting ordnance officers only.

9. Gas has a corrosive effect on grenades. Therefore, in the event of a gas attack, unboxed grenades should be covered. After the attack is over, the safety pin and working parts should be cleaned and oiled.

10. General instructions regarding the firing and throwing of live H.E. grenades:—

i. Although the use of grenades can be taught in all its branches by employing dummy material only—the dummy grenade behaves in exactly the same way as a live one except that it does not explode—the training of a bomber cannot be considered complete until he has thrown and fired live grenades.

ii. Live practices are simply to give confidence to the man in handling a weapon which is, wrongly, supposed to be very dangerous. With present-day equipment accidents can generally be traced to one of four main causes:—

Ignorance.

Negligence.

Deliberate mishandling.

Fright.

The first three can be excluded by training and supervision; the last can be overcome by live practice. Confidence comes quickly after firing or throwing even one grenade. Should the allowance of grenades permit, two should be thrown in addition to those fired from the discharger.

iii. *The range.*—The plan of the danger area of the live H.E. bombing range is shown in S.A.T., 1931, Vol. V, Plate 44, and of suitable live throwing and firing trenches in Plate 45. The danger area must be clearly marked out by red danger flags and lookout men posted whenever the range is in use. A minimum distance of 200 yards must be allowed in all directions from every possible point of burst.

iv. *Targets.*—These should be shallow trenches and shell-holes. One target for throwing will be placed in front of each throwing bay. For firing, a single set of targets, at distances intermediate between the minimum and maximum ranges of the weapon, will suffice for all firing bays.

11. Safety precautions (see S.A.T., 1931, Vol. V, Plate 45).— The following precautions will be observed:—

i. Before a live practice begins, all danger flags must be raised, look-out men posted and the whole of the ground, including the danger area, ascertained to be clear of persons and livestock.

ii. A medical orderly provided with all first-aid appliances should be in attendance on the range under suitable cover, generally in one of the splinter-proof shelters. If a medical orderly is not available, a box containing tourniquet, bandages, iodine, etc., must be provided and kept in the observation post throughout the practice. In any case, the medical officer in charge of the troops concerned will be informed that live firing is to take place.

iii. Every person on the bombing range must wear a steel helmet.

iv. Smoking is forbidden on the range, and at any time when live grenades, detonators, etc., are being handled or carried.

v. A red danger flag will be kept on the control post during practice. This will be lowered as a signal that practice is about to begin, the officer having first satisfied himself that danger flags and look-out men are in position and that the range is clear. No person may enter the danger area unless the flag on the control post is raised.

iv. A qualified officer will always be in charge and will control the practice from the control post.

vii. A N.C.O., who must be a trained bomber, will be on duty in each priming bay and in each throwing or firing bay.

viii. Not more than one person in addition to the N.C.O. on duty will be in any priming, throwing or firing bay at any time.

ix. Everyone, except the officer in the control post, the N.C.Os. on duty in the priming, throwing or firing bays, and the men actually throwing, priming or firing, will be under cover in the splinter-proof shelters.

x. No grenade will be primed until the man enters the primary bay preparatory to throwing or firing. To ensure that this rule is obeyed, the box containing the igniter sets will be in the possession of the N.C.O. on duty in the priming bay, who will issue the number required to each man in turn as he enters and will personally superintend the operation of priming.

xi. No grenade will be loaded, and no man will fire or throw, without the direct order of the officer in charge.

xii. Any order to take cover must be instantly obeyed.

- xiii. To eliminate any possibility of prematures, all the points laid down for the inspection and preparation of grenades, igniter sets, etc., will be strictly observed (see paras. 12 and 13, below).
- xiv. Every blind will be accounted for and destroyed before the party leaves the range.
- xv. The "demolition" box must always be on the range during practice.
- xvi. On hard ground it is advisable to have either a partially filled or folded sandbag under the heel of the butt to avoid damage to the rifle.
- xvii. It is the duty of the officer conducting live practices to foresee the possible incidents that might occur through nervousness, or failure in the material being used, which are likely to endanger those taking part. He should instruct N.C.Os. and men in the immediate action to be followed (see special instructions in paras. 14, 15 and 16, below).

12. General points before firing and throwing live grenades.

—Live grenades must be carefully inspected as a preliminary to their preparation for use. This inspection is for the purpose of discovering:—

- i. Defects which might lead to prematures.
- ii. Defects which might cause blinds or weak explosions.

Inspection should always be carried out according to a definite plan, in order to prevent points being overlooked. The detail of inspection will depend upon the type of grenade (see Lesson 2).

Grenades and igniter sets will never be inspected together; the inspection of the grenades should be completed first; they will then be replaced and placed on one side. Inspection of the igniter sets follows.

13. The first safety precaution.—Whenever a grenade is first handled, the base plug will always be removed at once to ascertain whether it is primed or not.

14. Accidental release of striker when firing.—Grenade remains in discharger with fuze burning. In this case, rifle and grenade together must be thrown over the parapet at once and cover taken. No attempt must be made to save the rifle. The N.C.O. on duty must be prepared to take such action as may be necessary to ensure safety. This occurrence is generally attributable to defective ballistite grenade cartridges; the pressure produced—particularly with an open gas port—is just sufficient to lift the grenade nearly out of the discharger so that the lever is set free; the grenade then

slips back into the discharger. Variations of this may occur; the grenade may be forced from the discharger and fall into the bay. In such a case no attempt will be made to pick up the grenade. The occupants of the bay will at once take cover round the traverse and leave the grenade to explode. Should the firer show hesitation or lose his head in such circumstances, the N.C.O. on duty must be prepared to act instantly and with energy. He will be the last to leave the bay. The time fuze of seven seconds gives ample time for the clearing of the bay.

15. Grenade dropped with pin out.—It may happen occasionally that a clumsy or nervous man will drop a grenade when in the act of throwing. In such a case the action will be the same as that taken in firing when a grenade has been freed from the discharger and has fallen into the bay.

16. Method of conducting live practice:—

- i. Sections will be told off into details, the requisite number of unprimed grenades will be issued to each man, and they will then be marched into their respective splinter-proof shelters.
- ii. N.C.Os. for duty will then take their places; those detailed for the priming bays will have with them the necessary number of igniter sets in their boxes.
- iii. The officer in charge will take his place in the control post; he will have with him the demolition box and any spare grenades that there may be. Having ascertained that all safety regulations have been complied with, he will lower the control post flag and order the first detail into the priming bay.
- iv. The first detail will prime their grenades and pass on to the throwing or firing bays, as the case may be; the second detail will at once take the place of the first in the priming bay.
- v. Only those grenades will be primed which are to be used before the men return to the splinter-proof shelter; no man will return to the splinter-proof shelter with a primed grenade. Should the practice be cancelled for any reason before the number of primed grenades has been used, the N.C.Os. in throwing or priming bays will see—failing orders to this effect—that the unused grenades are unprimed; they will retain the igniter sets. This does not refer to the stopping of a practice due to a blind.
- vi. When a firing practice is being carried out, the procedure will be as follows:—

Command	Action
"No. 1—Range—Load . . . Target." (The number means No. of bay.)	No. 1 loads ballistite grenade cartridge, applies safety catch, sets range, loads grenade. As soon as he is ready, the N.C.O. will hold up his hand.
"No. 1—Prepare to fire."	No. 1 pushes forward safety catch and aims.
"No. 1—Fire."	No. 1 fires, observes flight of his grenade and takes cover.

Whenever the command "**Fire**" is given, the occupants in all other bays will take cover. The officer in the control post will observe the actions of the firer, the flight of the grenade, and that everyone has taken cover. He will then take cover himself. After the explosion he will continue as follows:—

Command.—"**No. 2—Range—Load . . . Target.**"

If there are more than two bays, the procedure will be the same until all have fired one grenade. No. 1 will then fire his second grenade, the same sequence being observed until all grenades have been fired by the detail.

Command	Action
"Detail—Change."	First detail moves to its splinter-proof shelters. Second detail replaces first in the firing bay, and third moves from splinter-proof shelter to priming bay.

vii. When a throwing practice is being carried out, the preliminaries, safety precautions and procedure will be as for "**Firing**," with the exception that the following words of command will be used:—

Command	Action
"No. 1—Ready."	No. 1 adopts the " Ready " position. The N.C.O. will hold up his hand as a signal to the officer when this has been done.
"No. 1—Throw."	No. 1 prepares the grenade for throwing; throws, observes flight of grenade and takes cover.

Whenever the command "**Throw**" is given, the occupants of all other bays will take cover. The officer will act as in firing practice.

viii. *Action in case of blinds.*—Should a blind occur, everyone will remain under cover until further orders. After an interval of five minutes, the officer in charge will proceed alone to destroy the grenade where it lies (see Lesson 10).

ix. For the purpose of recording and reporting failures and defects, the officer in charge will observe any irregularities in the performance of the grenades.

17. Reporting failures and defects.—All cases of failures and defects in material will be recorded, and, if it is considered that they are due to faults in design or manufacture, a report will be made in the prescribed manner.

Such cases would be:—

- Defects noted during the inspection of grenades and igniter sets.
- Failure of any portion of the igniter sets, *e.g.* cap, fuze, detonator.
- Failure of the grenade to detonate although the burster set has functioned perfectly. When this failure occurs, the grenade is burst into two or three large pieces by the detonator, and if examined, some of the explosive will usually be found; very little noise is made by a grenade bursting in this way.
- Defects in ballistite grenade cartridge, *i.e.* missfires, weak explosion resulting in grenades going short or even remaining in discharger, blowbacks, split cases, etc.
- Any defects found in rifles or dischargers after use.

In making such records or reports, the following information will be obtained, if possible:—

Designation of article, number, mark, etc.
Dates of manufacture and packing.
Name of manufacturer, packer's notes, etc.
Any markings on the article in question, such as base markings in the case of cartridges.

In the case of the failures mentioned in iv, above, the number of the rifle and of the discharger will also be recorded. Whenever the defective article itself can be produced, it should be forwarded with the report.

LESSON 10.—PREPARATION OF DEMOLITION SET AND DESTRUCTION OF BLINDS

(For Instructors only)

Instructor's Notes

Stores:—

Demolition box containing:—

Box Fuze, Safety, No. 11.

Box No. 8, Mark VII, detonators.

Cylinder 1 oz. gun-cotton primers.

Luting.

Rectifier.

A knife and matches will be required. The latter will not be carried in the demolition box.

For training purposes the detonators and gun-cotton primers will consist of dummy material.

All officers, warrant officers and N.C.Os. whose duties in peace or war require them to deal with live grenade training must be able to assemble a fuze and detonator and prepare a demolition set. They must know the safety precautions and rules laid down for the conduct of "live" practices and handling of "live" material as set out in the general paragraphs of this section. The grenade, having been fired or thrown, will sometimes fail to explode. This is called a "blind." When a blind occurs, it is the duty of the officer conducting the practice to destroy it. To do this he uses a demolition set and acts as explained in this lesson.

Explain and, where necessary, demonstrate:—

1. **Fuzes.**—In firing charges of explosive, it is necessary for the man who is firing the charge to be able to do so from a safe distance, or to be given time to take cover before the explosion occurs.

For firing charges at a distance, "instantaneous" fuze is employed; this burns at the rate of about 90 feet in one second, and the length used depends on the safety distance required.

- i. Instantaneous fuze is never used in grenade work, even for the destruction of blinds, but it is necessary for everyone who may have to destroy blinds to be familiar with its appearance and characteristics

in order to be able to distinguish it. The types of instantaneous fuze in use are as follows:—

Mark IV.—Coloured red. The exterior consists of a waterproof tape covering.

Mark V.—Coloured orange, used for training purposes, is ribbed on the outside by means of crossed threads wound round it to enable it to be distinguished by touch in the dark.

Fuze, instantaneous detonating.—Used for mining and demolition purposes, and is contained in tin or lead tubing.

- ii. **Safety fuze** is used in grenade work in connection with the destruction of blinds, and also forms part of the firing mechanism of grenades.

It is slow burning, and is used in comparatively short lengths. The time that elapses between the lighting of the fuze and the explosion allows the firer to get under cover.

- iii. **Fuze, safety, No. 11.**—This fuze, coloured black, is used for demolition purposes and burns at the rate of 36 inches in approximately 90 seconds (1 inch in $2\frac{1}{2}$ seconds). There may be a variation of 15 seconds, less or more, in every 36 inches. It consists of a core of finely ground gunpowder surrounded by strands of hemp or jute covered by a layer of gutta percha and finally by a covering of black waterproof tape. It is packed in tins containing rolls of 48 feet. The rate of burning is marked on the label on the lid of the tin.

2. Fuze precautions:—

- i. When a new box is taken into use, the rate of burning should be tested by burning a measured length—say, 12 inches—and noting the time taken and a record placed in the box.

- ii. Always unroll the fuze; attempts to straighten out a coil by pulling the loose end will result in the formation of kinks and breakage of the powder trail; this may cause failure in use. The end of the fuze which is to be lighted must be cut on the slant so as to expose a large area of the powder trail.

- iii. *Lighting the fuze.*—Fuze may be lighted easily by means of a fuzee specially made for this purpose, but generally matches only will be available.

Fuze cannot usually be lighted by applying the flame of an ordinary match; the flame temperature

is too low and only results in melting the gutta percha in the fuze, which then covers the surface of the powder trail and lighting becomes impossible.

The method to be adopted, therefore, is to hold the match against the fuze, so that its head is in direct contact with the end of the powder trail, then to rub the prepared surface of the match-box on the head of the match; the burst of flame in close contact with the powder causes it to ignite at once.

- iv. Safety fuze cannot be extinguished even by placing it under water.

3. Detonators.

- i. There is one particular property of high explosives which distinguishes them from gunpowder and certain other low explosives; they can be detonated. Detonation is very much more violent than ordinary explosion and, therefore, the effect produced by a given quantity of explosive is very much greater. Detonation, however, cannot generally be caused by lighting a high explosive in the ordinary way; it is necessary to initiate the detonation in some way, and for this purpose a device called a detonator is employed. Its characteristics are that it can be detonated by a blow (as in a percussion cap), by friction or by a flame. A detonator can, therefore, be set off by the flame from a safety fuze, and, if placed in contact with a high explosive charge, will cause it to detonate.
- ii. The detonator, as used in bombing, consists of a small copper tube closed at one end and partly filled with a small quantity of very sensitive and powerful explosive, much too sensitive to be used in large quantities. This explosive is generally fulminate of mercury, or some mixture of this substance. These detonators are classified as "service" or "commercial," and their size is expressed by a number.
- iii. The only detonator supplied for service use is Detonator No. 8, Mk. VII, and no other type of detonator will be used for the destruction of blind grenades. The No. 8, Mark VII, detonator is painted red and has a small label affixed to it bearing its designation; they are packed in red tin boxes containing 25, each in a separate recess.

4. Detonator precautions.

In view of the sensitiveness of the explosive contained in detonators, they must be handled with great care. They

must not be struck, crushed or bent, nor subjected to heat or friction. No attempt will be made to interfere with the substance contained in them.

They are quickly affected by damp, and should always be kept closed in their boxes.

5. Assembling fuzes and detonators.

Using a sharp knife, cut the length of safety fuze required (safety fuze burns at the rate of approximately two feet a minute). In no case should a shorter length than two feet be used. The end for insertion into the detonator should be cut square, and the end to be lighted cut on the slant. On each occasion a length of fuze should be burnt as a test for time and reliability.

Remove any loose threads that may be sticking to the outside of the fuze where it is to be inserted into the detonator.

Measure the distance from the mouth of the detonator to the surface of the fulminate by inserting a blade of grass, and mark off on the fuze a length $\frac{1}{4}$ inch less than this.

Smooth down the end of the fuze with the fingers, so that it will go easily into the detonator, and insert it gently up to the mark previously made. Do not use a screwing motion in doing this, as the friction which might possibly be caused would be dangerous.

The fuze must now be fixed to the detonator with a clasp knife in the manner shown in Fig. 18. Care should be taken that no pressure is put on that portion of the detonator containing the fulminate.

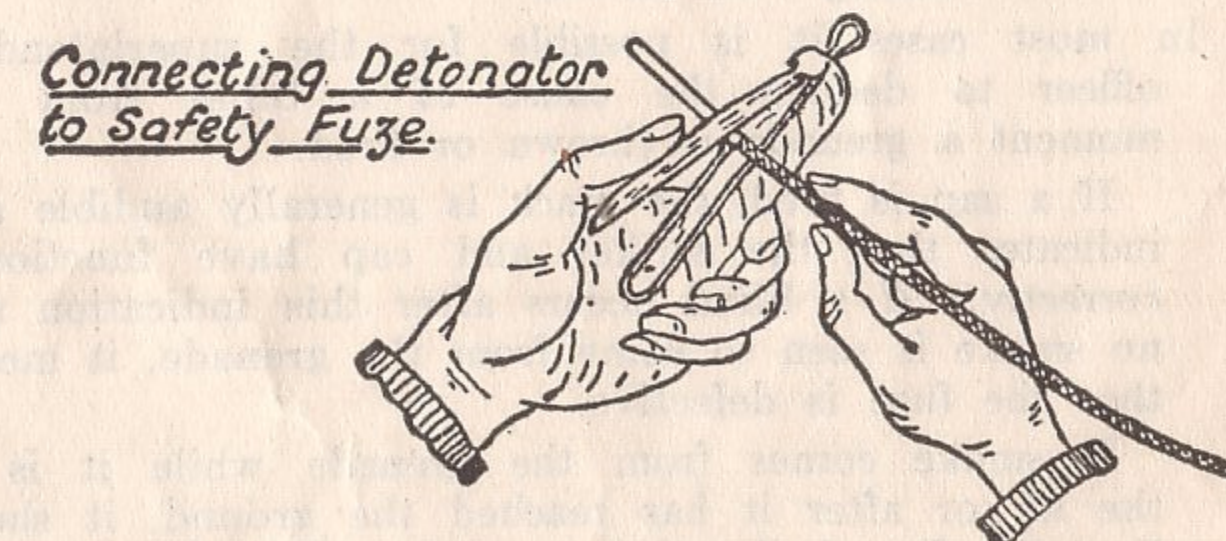


Fig. 18

Crimp the mouth of the detonator so that the fuze is firmly gripped. A detonator once crimped to a fuze will never be pulled off. Should it be necessary to remove it, the fuze must be cut.

Fuze and detonator are then ready for use, but, to avoid any possibility of flame or water penetrating between the fuze and the detonator, the joint is luted. If no luting is available, mud may be used. Only a very small quantity of luting should be used, just sufficient to fill any small crevices that there may be (*see Lesson 2*).

6. Practise squad.

7. Assembling a demolition set.—A suitable length of safety fuze will be fitted to a No. 8, Mk. VII, detonator (8 inches of No. 11 fuze gives about 20 seconds). A gun-cotton primer will be prepared for the reception of the detonator by easing out the central hole with the wooden rectifier; this operation must be carried out gently, so as to minimize friction. No metal instrument will ever be used for this purpose. The detonator will then be fitted into the primer; the detonator must never be forced in; if the hole in the primer is not large enough, it must be further enlarged with the rectifier.

The primer should be rectified to accommodate the detonator snugly, without the use of luting or mud, which should not be necessary.

When preparing the charge, the officer may be assisted by one other person only; with this exception everyone will remain under cover.

8. Practise squad.

9. Method of dealing with blinds:—

- i. In most cases it is possible for the superintending officer to deduce the cause of a blind from the moment a grenade is thrown or fired.

If a cap is fired, the crack is generally audible and indicates that the striker and cap have functioned correctly. If a blind occurs after this indication and no smoke is seen to come from the grenade, it means that the fuze is defective.

If smoke comes from the grenade while it is in the air or after it has reached the ground, it shows that the fuze is burning properly. If a blind occurs after both these indications, it means that some defect has prevented the flame from reaching the detonator or that the detonator is itself defective.

- ii. *Preliminary action of superintending officer.*—When a grenade fails to explode, the practice will be stopped and everyone will remain under cover until further orders. An interval of five minutes will be observed from the time the grenade should have burst before any action is taken to deal with the blind. It is then the duty of the superintending officer to proceed alone to the grenade and take the appropriate action as indicated below. He will not touch the grenade but will immediately destroy it where it lies.

- iii. *Destruction of blinds.*—The superintending officer will place the demolition set, as described in 7 above, so that the primer touches the grenade. In doing so he will take care not to disturb the grenade. Having ascertained that all other persons are under cover, he will light the fuze and himself take cover. After the explosion he will examine the place, to make certain that the blind has been destroyed.

- iv. Whilst engaged in placing or lighting the demolition set, the officer should be careful to fasten his steel helmet or anything likely to fall off and disturb the grenade.



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